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Railroad Suspension Chair.

The enormous sums expended annually by our railroad companies in repairing the ends of the rails which are battered by the numerous wheels so frequently passing over them, are stimulating inventors to devise some effectual mode of obviating the evil. One of the most novel plans which has been suggested for this purpose is illustrated by the annexed engravings. It consists in a chair for supporting the ends of the rails so formed as to yield slightly to the concussion of the wheels and thus diminish the shock.

Fig. 1 of the engravings is a perspective view of a railway track showing the manner of attaching the chair. Fig. 2 is a side elevation of the chair connecting the ends of two rails. Figs. 3, 4 and 5 are cross vertical sections of the chair and rail.

Fig. 1

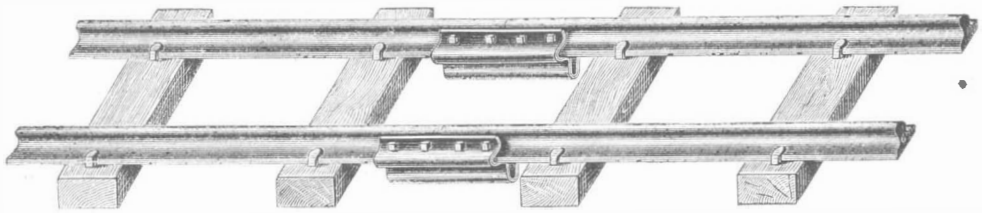
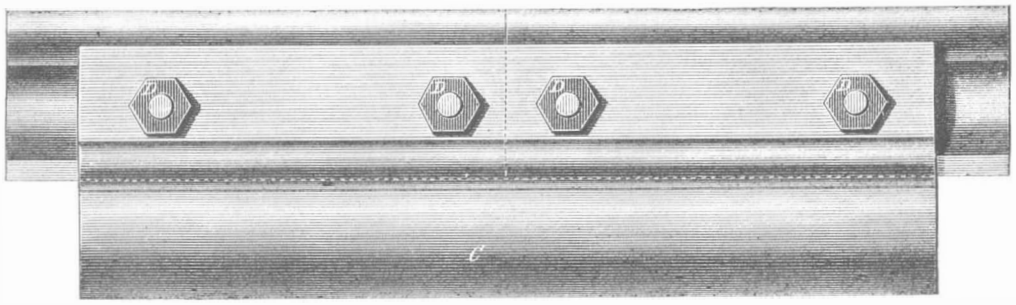


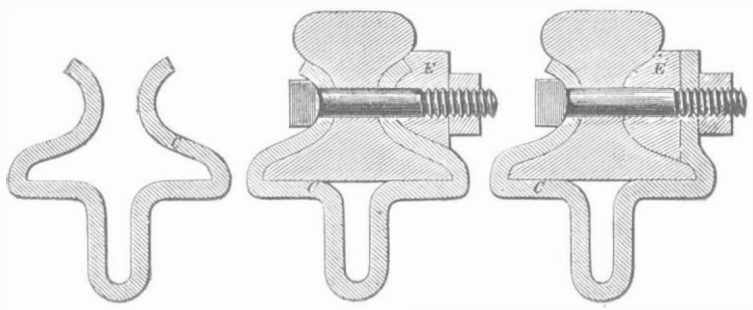
Fig. 2



LEONARD'S RAILROAD SUSPENSION CHAIR.

The chair, C, (18 inches long more or less,) is made of boiler or sheet iron, in one piece. It is intended to be formed by machinery so that it shall fit exactly to the sides and bottom of the rail, as seen in Fig. 3. Underneath the rail the plate is bent downward in a U-shape to the depth of $2\frac{1}{2}$ or 3 inches, more or less, which thus forms a strengthening rib sufficient to sustain every weight that may come upon it, but it is not heavy enough to form a solid bed on which the ends of the rails can be hammered or battered by the passing wheels. This U-shaped rib also serves another important purpose. In putting the chair upon the rails it allows the sides of the chair a chance to yield or spread apart, and thus accommodate itself to those variations in the thickness of the rails which are unavoidable. This elasticity is a very necessary consideration in the easy application of the chair to the rails, as it saves all fitting by cutting or filing. After the chair is in place the bolts, D D D D, are screwed up, and thus bring the sides of the chair into close-fitting contact with the sides of the rail. The bolts, D D D D, pass through slots in the web of the rail; these slots are long enough to allow for all expansion of the rail by heat.

Fig. 3 *Fig. 4* *Fig. 5*



On a hard rigid road-bed the nuts of the bolts, D D D D, are liable to loosen from the jarring produced by the rolling stock, and to guard against such a contingency, a wooden cushion or washer, E, Figs. 4 and 5, is introduced in order to impart such an elasticity as will almost entirely overcome this tendency. This is very important, as a great deal of labor is saved thereby.

The patent for this invention was granted February 5, 1862, and further information in relation to it may be obtained by addressing the inventor, Ira Leonard, at Lowell, Mass.

Disappearance of a Nebula.

The eminent astronomer, J. R. Hind, of London, has published the following letter :—

Toward the close of the past year it was announced by Prof. d'Arrest, of Copenhagen, that a nebula in the constellation *Taurus*, which was discovered at this observatory on the 11th of October, 1852, had totally vanished from its place in the heavens. That one of these objects, which the giant telescopes of the present day had taught us to regard as assemblages of stars in myriads at immense distances from the earth, should suddenly fade away, so as to be quite imperceptible in powerful instruments, must, I think, have been deemed a very improbable occurrence, even by many who are well acquainted with the care and experience of the observer by whom the statement was made. Within the last few days, however, Mr. Le Verrier has obtained so strong a confirmation of its accuracy that there is no longer room for supposing it to have originated in one of those errors of observation which every practical astronomer knows will creep into his work in spite of all his precautions.

The nebula in question was situated in right ascension 4 hours 13 minutes 54.6 seconds, and north declination 19° 11′ 37″, for the beginning of 1862. It was, therefore, about a degree and a half from the star *Epsilon* in *Taurus*, in the group commonly known as "the Hyades." Its diameter was about one minute of an arc, with a condensation of light in the center; or its appearance was that of a distant globular cluster, when viewed in telescopes of insufficient power to resolve it into stars. From 1852 to 1856 a star of the tenth magnitude almost touched the edge of the nebula at its north-following edge; it was at first remarked on the night the nebula was detected, having escaped notice on many occasions when its position had been under examination with the same telescope and powers. Hence I was induced to hint at its probable variability in a note upon the nebula, published in No. 839 of the *Astronomische Nachrichten*. The suspicion is fully confirmed; the star has diminished to the twelfth magnitude, either simultaneously with, or soon after, the apparent extinction of the nebula.

The history of this object, and the result of his observations on the night of January 26th, are appended by Mr. LeVerrier to his meteorological bulletin of the 29th. The sky being very clear at intervals, the Paris equatorial, which has an object glass twelve French inches in diameter, was directed to the place of the nebula, but notwithstanding stars of an extremely faint class were visible in its immediate neighborhood, not the slightest trace of it could be perceived either by M. LeVerrier or M. Chacornac. The star which Professor d'Arrest and I have repeatedly noted, of the tenth magnitude, and almost touching the nebula, had dwindled down to the twelfth; so that telescopes which would have shown it well between 1852 and 1856, would not at present afford a glimpse of it. From the fact that M. Chacornac saw the nebula in forming a chart of the stars in that region in 1854, and did not remark it while reconstructing the same in 1858 with a much more powerful instrument, there is reason to infer that the disappearance took place in 1856 or the following year.

How the variability of the nebula and a star closely adjacent is to be explained, it is not easy to say in the actual state of our knowledge of the constitution of the sidereal universe. A dense but invisible body of immense extent, interposing between the earth and them might produce effects which would accord with those observed; yet it appears more natural to conclude that there is some intimate connection between the star and the nebula, upon which alternations of visibility and invisibility of the latter may depend. If it be allowable to suppose that a nebula can shine by light reflected from a star, then the waning of the latter might account for apparent extinction of the former; but in this case it is hardly possible to conceive that the nebula can have a stellar

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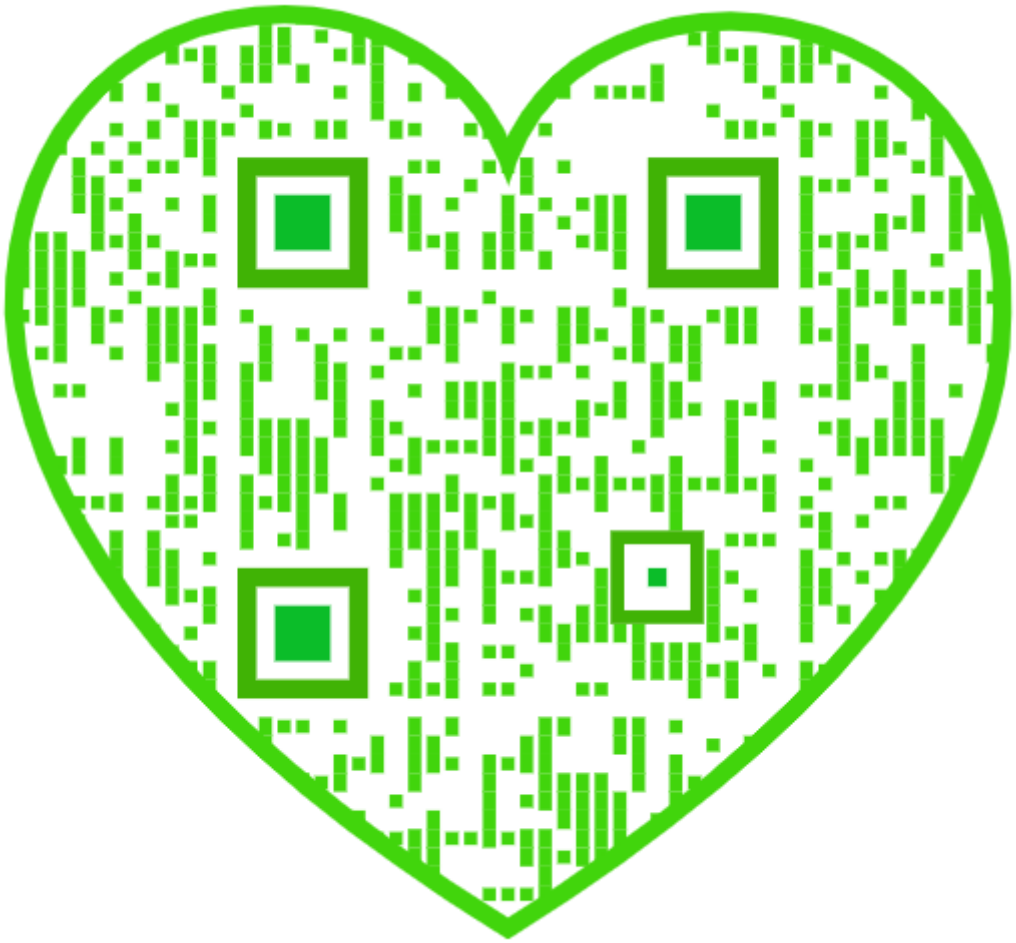

constitution. It is at least curious that several variable stars have been detected in the region of the great nebula, in *Orion;* that in 1860 a star suddenly shone out in the middle of the well-known nebula *Messier* 80 (about half-way between *Antares* and *Beta* in *Scorpio*) which vanished in a few days, and that, as first remarked by Sir John Herschel, all the temporary stars, without exception, having been situate in or near to the borders of the *Milky Way*—the star cluster or ring to which our system of sun and planets belongs. In the latter class are included the memorable star of B. C. 134, which led Hipparchus to form his catalogue of stars, and those which blazed forth in 1572 and 1604, in the times of Tycho Brahe and Kepler.

In concluding, I will venture to express the hope that some of the many amateur astronomers in this country who have provided themselves with telescopes of first-rate excellence, will keep a strict watch upon the remarkable pair of variables which I have briefly described in this communication. Continuity of observation is often most important, and can only be secured and that not always in the uncertainty of weather by a strong force of observers in different localities.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

The great armies are now face to face and the clash of arms may any moment break upon the ear. We heartily wish that the nation might be spared the further effusion of blood—that our erring fellow citizens would lay down their arms and return to their allegiance, and experience at once how readily our government and the loyal people would offer protection even to those who have been deceived by bad leaders to take up arms against constitutional authority. But such a result cannot be expected, and more battles must be fought and more blood be shed; therefore the sooner these great armies are pitted against each other in deadly strife the sooner may we look for a solution of the great national trouble. As we think of our country thus afflicted, which but a few months ago was the most prosperous on the globe, we are led to wonder more and more why a portion of our people could have become so thoroughly maddened as they now are.

At last accounts Gen. McClellan was within a few miles of Richmond, pushing forward to the attack with a commendable zeal and prudence, and it seems to be understood that the enemy will dispute the right of occupation with great desperation.

Gen. Halleck was within three miles of Corinth at last advices, cautiously approaching the foe. This General, like Gen. McClellan, is prudent and able, and knows that it will not do to rush pell mell upon the foe, but must approach cautiously and carefully, to guard against surprise. At the very hour that we now write half a million of men may be fighting. We contemplate such a struggle with horror, confident, however, that we shall triumph.

A GALLANT NAVAL EXPLOIT.

Wherever the armies of the United States have advanced it has usually found warm friends in the colored population, and, could all the events of the war be faithfully chronicled, it would appear that those people have furnished our officers with much valuable information, while it cannot be denied that they have often been used as spies against us.

Commodore Dupont reports a most gallant exploit on the part of eight negroes in the running out of Charleston harbor an armed vessel—the *Planter*—and surrendering her to the Federal blockading squadron. Commodore Dupont, in his report to the Secretary of the Navy, gives the following account of the matter: "At four in the morning, in the absence of the captain, who was on shore, she left her wharf, close to the government office and headquarters, with the Palmetto and Confederate flags flying—passed the successive forts, saluted as usual by blowing the steam whistle. After getting beyond the range of the last gun she hauled down the rebel flag and hoisted a white one. The *Onward* was the inside ship of the blockading squadron in the main channel, and was preparing to fire, when her commander made out the white flag. The armature of the steamer is a 32-pounder or pivot, and a fine 24-pounder howitzer. She has, beside, on her deck four other guns—one a 7-inch rifled—which were to be taken on the morning of the escape to the new fort on the middle ground. One of the four belonged to Fort Sumter, and had been struck, in the rebel attack on the fort, on the muzzle. Robert Small, the intelligent slave and pilot of the boat, who performed this bold feat so skillfully, informed me of this fact, presuming it would be a matter of interest to us to have possession of this gun. This man, Robert Small, is superior to any who have come into our lines, intelligent as many of them have been. His information has been most interesting, and portions of it of the utmost importance."

GUNBOAT OPERATIONS ON THE JAMES RIVER.

The James River is now clear of obstruction to within seven or eight miles of Richmond. At that point there is a heavy battery mounted on a high bluff, and the river is temporarily closed to navigation by sunken vessels, piles, chains, &c. In a recent attempt of our iron-plated gunboats—the *Monitor* and *Galena*—to pass this point they were temporarily prevented by these obstacles.

It appears that an attempt was made by the gunboats to remove these obstructions, under a fatal fire from the fort, which was able to pour its shot with accuracy down upon them, while they could not reply with much effect. This fort can only be reached with mortars; but if the obstructions could be dragged out of the channel the gunboats might easily pass the fort and have the city of Richmond at their mercy. The *Galena* and *Monitor*—which alone could be effective at short range—could not elevate their guns sufficiently to be of service in reducing the battery. No land force accompanied the squadron, and hence, as the place is totally unfavorable for a naval attack, it could not be taken. The vulnerable part of iron-clad boats is their deck plating, which, being only one inch thick, is penetrable by the largest shot by a plunging fire from an elevated position. The wooden vessels were wholly incapable of assisting in the reduction of the fort. Unless the fort has been captured by this time it will probably impede the passage of our boats quite seriously, except it be flanked. The first shot of the enemy's gun rolled off the sides of the *Galena*, making only dents in her mail, but gradually, after five hous fighting, it was found that the steel pointed balls used by him were piercing her. Thirty shots struck her and lodged, while two went entirely through her, tumbling out on the other side. The *Monitor*, however, maintained her superior strength and invulnerability. The balls glanced harmless from her tower of strength and fell into the placid waters of the river. The small gunboat *Naugatuck*, fitted up by E. A. Stevens, of Hoboken, to illustrate in some degree the large battery which he is trying to complete, accompanied the expedition, and carried a single rifled gun—a 100-pounder Parrott. Shortly after being brought into action this gun burst, and the vessel was obliged to withdraw. It is expected that the attack will be speedily renewed by a more formidable force, including mortar boats, which can operate with more success upon such elevated points than can gunboats.

THE PRESIDENT ON GEN. HUNTER'S PROCLAMATION.

Gen. Hunter, commander of the department embracing South Carolina, Georgia and Florida, issued a proclamation on the 9th inst., declaring the slaves of those States forever free. The President has taken the matter in hand, and has declared Gen. Hunter's act null and void, and, in order that there may be no future interference with his authority on this point, the President announces the following to be his position:—"I further make known, that whether it be competent for me, as Commander-in-Chief of the army and navy, to declare the slaves of any State or States free; and whether at any time, or in any case, it shall have become a necessity indispensable to the maintenance of the government to exercise such supposed power, are questions which, under my responsibility, I reserve to myself, and which I cannot feel justified in leaving to the decision of commanders in the field. These are totally different questions from those of police regulations in armies and camps."

We are glad to know that the President has finally entered his caveat as an admonition to all military commanders to attend strictly to their duties. Let them attack the enemy boldly and vigorously, and leave all questions of civil policy to be settled by the government. Some few of our generals have made fools of themselves by their silly and ridiculous proclamations, even before they were sure of holding the ground on which they stood.

PONTOON BRIDGES.

The Fredericksburgh correspondent of the Philadelphia *Inquirer* says:—"The pontoon bridge across the Rappahannock, at this place, is one of the greatest inventions of the age. The pieces are numbered, and together with the gutta-percha floats, are carried in wagons from stream to stream. The corps attached to the pontoon have become so perfect in their laying of the bridge that a stream, the width of the Rappahannock, can be crossed by the bridge in a few minutes. We have just witnessed some practice with another bridge than that already laid down, and the performance is really wonderful. The government is now repairing the railroad bridge over the Rappahannock, and in a few days the cars will be enabled to run from Aquia Creek into the city of Fredericksburg.

MILITARY TELEGRAPH CABLE SUCCESSFULLY LAID.

The submarine telegraph cable was successfully laid on the 19th inst., across the Chesapeake Bay, from Cherry Stone to Back River in Virginia, and the War Department is now in telegraphic communication with Fortress Monroe and Gen. McClellan's headquarters.

The cable, twenty five miles in length, is heavily armored with sixteen stout iron wires, arranged longitudinally, like the staves of a barrel around the insulating coat and conductor, and protecting them from all strain by any force short of what would be required to break the covering wires, the aggregate strength of which equals that of a ship's chain cable.

The longitudinal wires are hooped by a still heavier wire, wound spirally round them, which binds them together so that they form a strong but flexible tube of iron that effectually protects the conductor and the insulating coat. This is deemed a great improvement over the English system of spiral wire armor which was used in the Atlantic cable, and tended so strongly and incorrigibly to twist and kink.

At the time of laying the first temporary cable, there was no heavy cable in this country, or machinery for its expeditious manufacture. The experiment was made with such cable as could be extemporized at the moment, and which was constructed like the English cable, 370 miles in length, laid in the Black Sea, between Varna and Balaklava, during the Crimean war, and which worked so admirably for several months.

The temporary cable worked successfully, and most opportunely to relieve the public mind on the memorable Sunday of the battle between the *Monitor* and the *Merrimac*, but in a few days was dragged away by anchors, or otherwise broken—an accident not likely to happen to a cable of such immense strength as the new one.

The present cable was manufactured in New York, under the orders of Col. Anson Stager, Military Superintendent of United States Telegraphs, and was laid in four hours, under the supervision of Mr. Wm. H. Heiss, who also superintended its manufacture. A brake of novel construction was used to govern the paying out of the cable, and worked so admirably that it is thought it will overcome one of the greatest difficulties experienced in laying the Atlantic cable.

MISCELLANEOUS.

It is stated that the Scientific Board charged with the duty of examining into and reporting upon the merits and prospective advantages of the Stevens battery for harbor defence have made a very strong report against it.

Forty thousand pounds of powder have recently been removed from the hold of the steamship *Bermuda*, a prize steamer now lying in the port of Philadelphia.

The Vicksburgh *Citizen* of the 9th inst. announces that cannonading had been heard from our vessel on the previous day at Tunica, which is about fifty miles above Baton Rouge. We shall probably soon hear of the arrival of our gunboats at Memphis.

THE *Great Eastern* arrived at this port on Saturday May 17th, after a prosperous voyage. She is again in trouble; the owners having refused to make any recognition of the services of Mr. Towle, in devising the steering apparatus by which she was saved in September last, that gentleman has commenced legal proceedings against her.

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The "New American Cyclopedia."

This great work approaches completion. We have received from the publishers, D. Appleton & Co., Nos. 443 and 445 Broadway, the fourteenth volume, carrying the alphabet from REE to SPI. The following extracts will give a good idea of the manner in which the several subjects are treated :—

REGNAULT.

Henri Victor Regnault, a French physician and chemist, born in Aix la Chapelle, July 21, 1810. He holds the position of engineer-in-chief of mines, and director of the imperial manufactory of porcelain at Sèvres, and is also professor of physics at the college of France, and of chemistry in the polytechnic school. His attention has been devoted chiefly to heat in its combinations with matter, and he was the first to demonstrate that the latent heat of steam diminishes as the sensible heat increases, but in a slower proportion. He has also verified the law of Mariotte and Boyle on the compressibility of the gases. Accounts of his investigations on these subjects fill the twenty-first volume of the *Mémoires* of the French academy of sciences. Analogous researches on the specific heat of solids and liquids, on hygrometry, on the respiration of animals and kindred topics, have from time to time been published in the *Annales de chemie et de physique*. He is also the author of an elementary treatise on chemistry, translated into several European languages.

SADDUCEES.

The name of a Jewish sect. According to a Jewish tradition the name is derived from Tzadok, the reputed founder of the sect, who flourished in the early part of the third century B. C.; but Epiphanius derives it from the Hebrew word *tzaddik* (just), and says that the followers of the sect assumed this name, as they considered themselves preëminently as the just. Both these derivations are uncertain and doubtful. They appear in history for the first time under the Maccabæan Jonathan, about 144 B. C. They acknowledged only the written law, and rejected the obligatory character of all traditions; they denied the existence of spirits and angels in general, and held that the soul dies with the body, and has to expect neither reward nor punishment after death; they also denied a special providence, and made all human actions solely dependent on the free will of men. The sect was never numerous, especially in comparison with the Pharisees, but highly influential, as it mostly recruited itself from the educated and wealthy classes. Toward the close of the distinct national existence of the Jews the Sadducees were formally excluded from Judaism, and gradually disappeared; but some of their principles were revived by the sect of Caraites. A valuable work on the Sadducees has been written by Grossmann, *De Philosophia Sadducæorum* (Leipsic, 1836).

SALTS.

Before the time of Lavoisier, the name of salt was applied by chemists to almost any solid, crystallizable, transparent and soluble body; but he first restricted its meaning by defining a salt as "a body formed by the combination of an acid with a base, in which the properties of both are more or less neutralized." This was a great advance, but when the acids containing hydrogen were afterward discovered, it was perceived that this definition excluded their salts, which consisted only of a metallic element, combined with chlorine, bromine, iodine, sulphur, &c., and to which common salt, the very type of the class, belonged. To these compounds Berzelius proposed to give the title of haloid salts. A further extension of meaning has since been given, by applying it to all combinations of two binary compounds having a common element. Thus the combination of chloride of gold with another chloride is called a chlorosalt, and a combination of two sulphurets a sulphosalt. The salts of the oxygenated bases may unite to form double salts, of which alum (double sulphate of alumina and potash) is an example. Combinations of oxygen salts with oxides or haloid salts also occur, as well as of oxides with haloid salts, producing oxychlorides, &c. Salts may be neutral, acid, or alkaline, according to the proportion between the acid and the base. The salts formed by any given acid with the protoxides, sesquioxides, &c., of the metals, generally crystallize in the same or closely allied forms, or sometimes an acid may have two or more forms in which its salts occur. As an acid often forms more than one combination with a base, in that case of course different forms are produced. This property, known as isomorphism, extends to the haloid and other salts. The list of salts has of late years been multiplied manifold by the discovery of immense numbers of organic salts, in which either the base or the acid, and frequently both, are replaced by compounds, often very complicated, of carbon, hydrogen, nitrogen, &c. Haloid organic salts also exist, chlorine, bromine, &c., being replaced by such compounds as cyanogen, and the analogy to inorganic salts is in every respect perfect.

SARDINE.

A small and well-known fish of the herring family, and genus *alosa* (Cuv) It is regarded by Valenciennes and most ichthyologists as identical with the fish called pilchard on the coasts of Great Britain, though Cuvier made it distinct, giving it the specific name of *sardina*. On the former assumption no description is here necessary. Its flesh is very delicate. The fishery employs a great number of men and women on the coasts of Brittany, and to a less extent of Portugal. The vessels are generally of eight or ten tuns each, with a crew of six to ten; they go two or three leagues from land, and when they see fish spread their gill nets, scattering their bait, which consists of the eggs and flesh of fish, especially of the cod and mackerel, and sometimes salted fish and crustaceans. Some are salted on board, and the others are carried on shore, and either consumed fresh, or salted, or preserved in olive oil and melted butter for exportation; the tin cases in which they are packed are familiar to all. The larger fish are called *celans* in France, and pilchards in England; their shoals are preyed upon by codfish, and especially by porpoises. Fish of many other genera of the herring family are called sardines. In the East Indies species of *clupeonia*, *spratella*, *kowala* and *Dussumiera* (the last named belonging to the *erythrinidæ*) are placed on the table as sardines, and have a delicate flavor; in the West Indies *harengula clupeola* (Val.) is called the Spanish sardine, and *pellona Orbignyana* (Val.) in South America; many other species on our coast, if preserved in olive oil, would doubtless be as delicious as the European sardine.

SEED.

The regular perfect reproductive agent in phænogamous plants by which species and varieties are perpetuated. The center of fertile flowers contains a hollow organ called the ovary, and this covers a number of small excrescent growths composed of a delicate tissue, which are the ovules. After impregnation by means of the pollen these ovules rapidly increase in size and undergo many modification which end in the production of the seeds. Within each seed is the embryo or young plant, consisting of a radicle, plumule and cotyledons; and while developing itself, the membranes which surround it frequently store themselves with albumen or starchy matters to be used by the embryo while in the process of germination. In some species the cotyledons contain the albumen, and for the same purposes. The ripened seed is protected by several external envelopes called the testa, perisperm, or spermoderm, consisting of the hardened membranes which inclosed the ovule. A small eye or scar (*hilum*) upon the side of the seed indicates where the umbilical cord (*funiculus*) proceeding from the partition of the ovary (*placenta*) was attached to the seed. The funiculus in the nutmeg enlarges itself into the aril and envelopes the seed, forming the mace of commerce; in the spindle tree it enlarges into an investing brilliant-colored mantle or cloak. Seeds are smooth or rough, sculptured or embossed, marked by veins, depressions and elevations; and their testæ present much beauty in these particulars as well as in their colors and tints. They may be enveloped in fleecy substances, like the cotton, or bristly and hairy, or furnished with *alæ* or projections like wings, as in the *bignoniaceæ*. Many families of plants have small fruits or sorts of nuts so similar to seeds as to be ordinarily called by that name, but careful examination shows the presence of pericarpal coverings. In the *coniferæ* and *cycadaceæ*, however, neither the seed nor the ovule is ever invested with any coverings, and on these extraordinary exceptions Robert Brown founded excellent natural characters in those two orders.

The Pasha of Egypt will be among the visitors to the London Exhibition.

The Results of the Carbureting Process.

We find the following in the London *Engineer* :—

At the last meeting of the City Commission of Sewers, Deputy Lott moved that it be referred to the engineer and the medical officer to examine and report whether the light from the gas lamps in the public streets was increased or diminished by the carbureting process recently applied to them, and whether the light thrown upon the footways was not, as he submitted it was, obscured by the shadow of the boxes containing the material used in the process. In the course of a discussion on this subject, Mr. Haywood, engineer to the commission, read a letter addressed to him by Mr. Massey, secretary to the Great Central Gas Company, complaining that the Carbureting Company, in applying their process to public lamps within the city, were picking out a lamp here and there for the purpose, to the inconvenience of the company. Mr. Massey also stated that a few days ago, as the Carbureting Company's men were fitting one of their naphtha boxes to a lamp in Queenhithe it exploded. This, he added, was the third accident of the kind that had occurred within the last three weeks. The directors of the Great Central had directed him to call the most serious attention of the court to an instance of explosion in a bracket lamp in Harrow-alley. Had, he said, one of the numerous lamps fixed in the rear of the same premises ignited, instead of the lamp in question, the great probability was that, occurring as it did late in the night, the whole block of houses and buildings used as cattle sheds would have been burnt down. The owner of the property had made a communication as to the risk she was incurring, and expressing great fear and anxiety for the future.

Dr. Abraham said probably the accidents referred to, which were exceptional, were due to mismanagement, and therefore preventible. At all events they were not of a nature to induce the Commissioners to abandon the carbureting process, by which a great saving of money was being effected in the public lighting, and which, he believed, would be eventually adopted over the entire metropolis.

Mr. H. Lowman Taylor held that the saving of money was at the expense of light, for he had observed on a recent occasion, late at night, a sort of twilight gloom in places where the process was in use. Besides it was obvious that the boxes containing the naphtha, attached to the public lamps, threw shadows on the ground.

Dr. Abraham said it was well known, long before the carbureting process was adopted, that at advanced hours of the night there was always a paucity of gas, consequent upon the companies relaxing their pressure.

The subject, on the motion of Deputy Harrison was eventually referred to the General Purposes Committee for deliberate inquiry and report.

Webster's Great Dictionary.

We learn with much pleasure from the publishers, Messrs. G. & C. Merriam, Springfield, Mass., that the new pictorial edition of "Webster's Unabridged Dictionary" is having a very extended sale. Every school, every office, nay every dwelling, should be provided with it. It is the standard not only for spelling and definition, but also for correct pronunciation. The amount of general information which is also condensed within its pages is truly astonishing. In the course of a very extensive professional practice we have frequent necessity to seek out and apply the best technical terms and descriptions. Webster is our constant recourse, and we never consult him in vain. It is surprising to observe how replete the work is. As an educational medium this work enjoys a very high reputation. For the schools of New York State no less than ten thousand copies have been purchased, while in Massachusetts, Michigan, New Jersey and Wisconsin an equal number has been obtained, or one copy for almost every school. It is said that more than ten times as many copies of Webster are sold as of any other similar publication.

Plaster of Paris in Safes.—It will be seen that our Troy correspondent attributes the general failure of safes at the Troy fire, to the substitution of other materials for plaster of Paris. We shall have something further to say on this important subject.

The tax on dogs in the State of Massachusetts yielded in 1861, $17,972 65.

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Improved Propeller.

The accompanying engravings illustrate a novel propeller, invented by Charles O'Hara, of London, England, designed particularly for vessels of very light draft. The propeller detached from its connections is shown in perspective in Fig. 4. It is of semi-cylindrical form, and operates by oscillating upon a vertical axis, being completely submerged in a recess formed to receive it at the stern of the boat, H, as shown in Fig. 3. The engraving represents a semi-circular shield, G, at the top of the propeller brought forward so as to complete the circle of the upper surface; this form is preferred by the inventor, but is not essential. The surface which strikes the water is fluted with vertical concave grooves as shown. The propeller is connected with a steam engine and, being vibrated through a few degrees, presses against the water first upon one side and then upon the other of its axis, and thus drives the vessel along.

In order to draw the vessel backward the propeller must have its plane side turned forward, and in order to permit this it is necessary to connect it with the engine by some peculiar devices. These are represented in Figs. 1 and 2.

The cogwheel, A, is secured rigidly to the upper end of the propeller shaft, and the arm, B, is fitted loosely upon the shaft over the wheel, A. A slide, C, rests upon the arm, B, and has a tooth attached to it which passes through a slot in the arm, and may enter any one of the spaces between the teeth of the wheel, A. It will be seen that by carrying the slide from the center, the tooth is drawn out from between the cogs of the wheel, A, and thus the wheel is disengaged from its connection with arm, B. Its position may now be reversed, and then by drawing back the tooth between the cogs the connection between the wheel and the arm, B, is renewed, and the propeller is again subjected to the power of the engine.

To facilitate the breaking and reforming of this connection, a lever, D, is secured over the slide with its fulcrum at *e*, and a post upon the opposite side of the wheel having a notch to hold the lever in place. The lever operates on the slide by means of two studs, *f* and *g*, attached to the slide and rising one upon each side of the lever. When it is desired to turn the vessel around, the propeller may be turned but one-fourth of a revolution on its axis and secured in that position, when it will operate to move the stern of the vessel directly to one side. The propeller may be hung upon a horizontal axis if desired when one-half only is to be submerged.

The following advantages are claimed for this propeller by the inventor:—

1st. Simplicity of its structure and cheapness in manufacture.

2d. Simplicity and cheapness of the kind of engine used in connection with it.

3d. Very direct action.

4th. No loss of power by lifting water or displacing it, as is the case with the paddle wheel or screw.

5th. Great reduction in the consumption of fuel.

6th. For floating batteries the propeller is totally submerged, and all the machinery may be placed under the water line.

7th. No surge is caused by it in canals to injure or wash their banks, and no rapid vibrations tending to injure the boat or its machinery.

8th. On the shortest notice the propeller may be placed in a position to so oscillate that the vessel can be instantly turned out of her course to the right or left, to back water or to turn the vessel rapidly round on its own center.

9th. No danger of the propeller being injured by "sawyers" or "planters" in river navigation, or by ice, or any foreign matter.

10th. Weeds in shallows cannot impede its action.

11th. It may be used with sails, so that during direct winds fuel may be economized.

The American patent for this invention was granted through the Scientific American Patent Agency, April 22, 1862, and further information in relation to it may be obtained by addressing the assignee, W. O'Hara, at Toronto, C. W.

Fig. 1

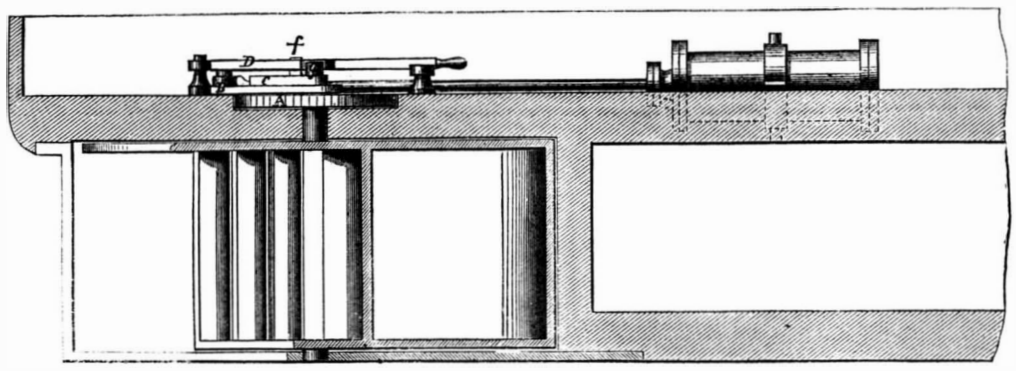
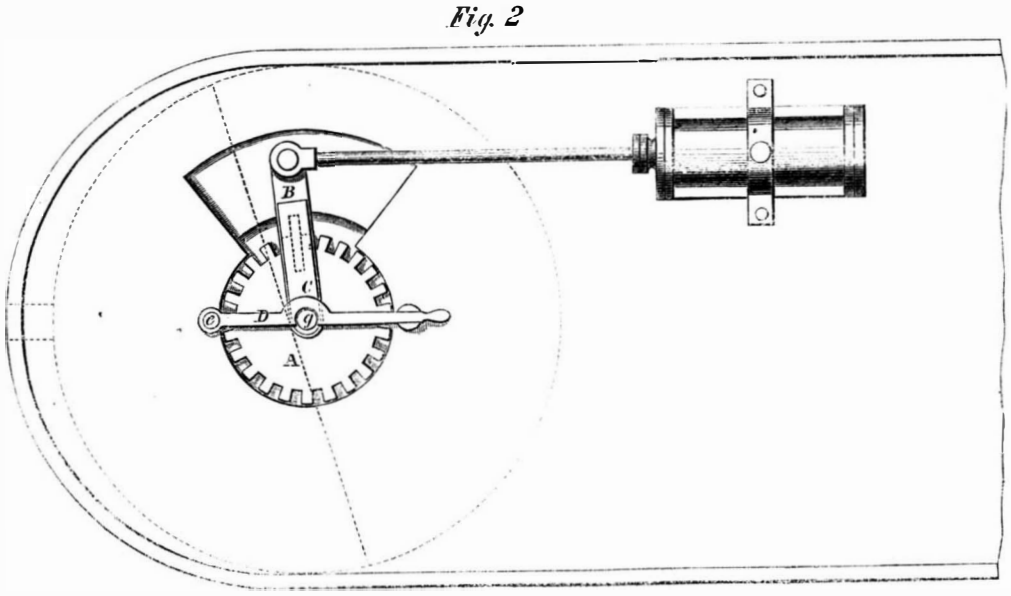


Fig. 2



O'HARA'S LIGHT-DRAFT PROPELLER.

Fig. 3

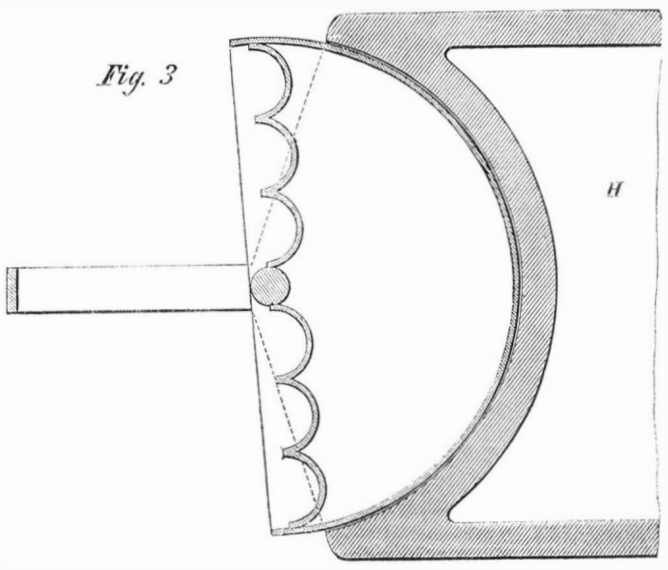
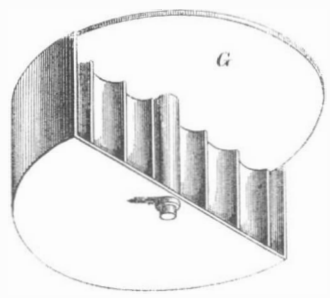


Fig. 4



Valuable Substitute for Metal.

The London *Artizan* says:—Adamas, as a substitute for metal in the manufacture of gas burners, has frequently been mentioned and it has also been stated that the same substance was equally applicable to various other purposes for which metal has been employed. The use of the adamas burners has recently become very general, and Mr. Leoni, the inventor and manufacturer of them, has now succeeded in introducing adamas taps and adamas machine bearings, the working of which has given the greatest satisfaction to those who have employed them. The mode of manufacture consists in reducing the silicate of magnesia to an impalpable powder, and then molding it into the desired form, and annealing it, the result being, that with the greatest facility the utmost precision may be obtained. When employed for taps the advantage is that an article is produced upon which neither heat nor acids have any effect, at a merely nominal price, and it is anticipated that at no distant period adamas steam cocks will come into general use, to which purpose the material is undoubtedly well adapted, since, on a trial of a couple of ordinary adamas beer taps (the price of which will be but 1*s.* or 1*s.* 3*d.* to the retail customer) the one began to leak at a pressure of 65 lbs. to the inch, and the other stood upwards of 80 lbs. without being affected. But the purpose to which the material may be considered as more especially applicable, is for the manufacture of machine bearings, the test which it has stood in this direction being certainly all that could be desired. A steel spindle was run in an adamas bearing for 100 entire days consecutively, at a speed of about 1,500 revolutions per minute, yet neither the spindle nor the bearing shows the slightest appearance of wear, and several other experimental tests have proved equally satisfactory. But as a single practical application is preferable to any amount of experimental testing, it may be stated that at the works of Mr. Grissell, the well-known engineer, a bearing has been for some time in use, and appears to succeed completely. They use it as a fan bearing as a substitute for a Babbitt's patent white metal bearing, brass having been previously proved to be quite inapplicable, owing to the great friction and resulting heat, and, although the shaft makes nearly 1,000 revolutions per minute, it is found that the adamas bearing remains quite cool, requires oiling but once a day, and shows no appreciable signs of wear. In the position in question the life of a Babbitt's bearing is five weeks, and it is confidently believed that the adamas will last far more than as many months.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held in their room at the Cooper Institute on Thursday evening, May 15th, the President, Prof. Joy, in the chair.

The preliminary half hour set apart for miscellaneous business was devoted principally to the discussion of

INDIA RUBBER.

Mr. CHURCHILL—Mr. President, here is a tube of india rubber which was burst by steam at a pressure of some 5 or 6 lbs., and it will be seen that some portions of it were forced outward and permanently deformed by the pressure. I have before presented here india rubber pipes which had been altered by the action of steam.

Mr. STETSON—A great desideratum in the arts is a flexible pipe that will resist the pressure and action of steam at the temperature at which steam is used in locomotives. Is there any mode of preparing india rubber so that it will do this, or is there any other substance known that will answer the purpose? Many valuable inventions have failed of success for want of such a material.

Mr. FISHER—I have known two cases in which india rubber was employed for steam pipes with success, and for a considerable time. In one case the pressure must have been nearly the same as is used in locomotives.

Mr. ROWELL—I had occasion this day to ascertain the temperature at which hard rubber is vulcanized, and I asked Mr. Day. He told me that the temperature for hard rubber is 350°, and for soft rubber considerably lower—about 310°. He says that if these temperatures are exceeded in the respective cases the rubber is completely destroyed.

Mr. STETSON—I see by Mr. Rowell's table that the pressure of steam at a temperature of 310° is 62 lbs. to the inch. So it would seem that the result to which we are brought by this discussion is that india rubber may be used for steam pipes at pressures below 62 lbs., but will be destroyed at higher pressures.

Prof. SEELY—When india rubber was first introduced we thought that it would answer for all purposes. I proposed myself to use it as a steam engine in the form of a bellows. But we soon discovered that its properties were destroyed by the action of many substances, spirits of turpentine, acids, &c., and they were altered by changes in temperature and by the action of the air. I procured a very pure sample as white as milk, but the surface soon became dark, and its tenacity was destroyed. It could be scraped off with a knife; it absorbed oxygen and was changed into a resin, like some other hydrocarbons—spirits of turpentine for instance, which becomes first oil of turpentine and then solid rosin.

When the art of vulcanizing was discovered it was thought at first that all of the difficulties were overcome. But experience has shown that vulcanized rubber is acted upon by all the agents which affect the crude material only in less degree, or more slowly. It becomes stiff in the cold, it is softened by heat, is dissolved slowly in spirits of turpentine and benzole, is spoiled if kept any considerable time in contact with grease, and is changed into resin by absorbing oxygen from the atmosphere. But all of these changes go on much more slowly in vulcanized rubber than in the crude material.

There is another difficulty with vulcanized rubber—that is the adulteration. Perhaps there is no other manufacture in which adulteration is so systematically and extensively practiced as in that of india rubber. Some of the articles in market do not contain 10 per cent. of rubber. Notwithstanding these depreciatory remarks, I regard india rubber as a very valuable substance. I should almost agree with Liebig in the opinion that the four most valuable materials for the chemist—naming them in the order of their importance—are glass, platinum, cork and india rubber.

The President then announced the regular subject of the evening,

THE MANUFACTURE OF SOAP,

continued from last week, and called upon Professor Seely to proceed with the discussion.

Prof. SEELY—The chemistry of soap was very ably presented at the last meeting by the President and Mr. Engelhard, and I propose to consider the subject a little more in the same direction, but without going over the same ground. Complex organic substances, on being decomposed, separate into simpler compounds. Woody fiber, for instance, if placed in a retort and distilled, is separated into carbonic acid, water, &c., so that in one sense woody fiber may be said to be composed of carbonic acid, water, &c. Nature seems to have built up the substances of which vegetable and animal organisms are constituted, by forming first some comparatively simple compounds, and then joining other elements to them. These compounds which lie at the root of organized structure are called organic radicals. They are nearly all composed of two elements only, hydrogen and carbon, and on close examination are found grouped in certain orderly series. The series which interests us in this discussion is constituted in this manner:—

$$C_2\ H$$
$$C_4\ H_3$$
$$C_6\ H_5$$
$$C_8\ H_7$$
$$C_{10}\ H_9$$
$$C_{12}\ H_{11}$$

There is a substance formed by the combination of two atoms of carbon with one of hydrogen, another consisting of four atoms of carbon and three of hydrogen, and so on; and I might continue the column up to 60 atoms of carbon and 59 of hydrogen. Now these substances differ in their properties in the same manner that they do in their constitution, that is by regular and equal degrees. $C_2\ H$ is a gas, $C_4\ H_3$ is a very volatile liquid, $C_6\ H_5$ is a liquid less volatile, and thus we go on through thicker liquids till we come to solids. There is the same regular increase in the melting points, in the specific gravities, &c.

We now come to the next step in the process. Each of these radicals will combine with three atoms of oxygen and one atom of water, $O_3\ H\ O$, and this combination forms a series of acids. We have then an acid series of the constitution

$$C_2\ H,\ O_3\ HO$$
$$C_4\ H_3,\ O_3\ HO$$
$$C_6\ H_5,\ O_3\ HO$$

and so forth.

These acids differ from each other by the same regular law as the radicals. Beginning with the simplest at the head of the column, they increase in specific gravity, in the boiling point, &c., as they become more complex.

The substances which we have been considering so far are known only to the chemist, but the next step brings us to things with which we are familiar. It is not natural for acids to be alone, and they are always ready to combine with bases forming salts. Any of the acids in the series which we have been considering will combine with a certain organic substance called the oxide of glyceryl, which is formed by the combination of one atom of carbon with three of hydrogen, and one of oxygen, $C_6\ H_3\ O$. This is the constitution of oils and fats. One of the acids in the above series is butyric, and if this acid combines with the oxide of glyceryl it forms butyrine, the principal ingredient of butter.

The salts formed by the combination of the several fat acids with the one base—the oxide of glyceryl—constitute a series which differ from each other in the same way that the acids and the radicals differ, that is by regular and equal gradations—the solidity, the specific gravify, and the boiling temperature all increase regularly with the complexity.

Now if any fat is brought in contact with an alkali or alkaline earth at a high temperature, the acid of the fat will leave the weaker base with which it is combined and will enter into combination with the alkali. This forms soap. Soap is a salt formed by the combination of a fat acid with an alkaline base.

Now I come to the point to which my remarks have been tending, and which it was my special object in speaking to present. That is, that as each acid in the series will form a soap by combining with an alkali, we have a series of soaps differing from each other, like the acids, by regular and equal gradations. Samples of these soaps for the complete series would constitute a very interesting collection for a learned society, like the American Institute.

Prof. Joy then gave an account of the ordinary mode of making soap, such as has been repeatedly published, and the Society adjourned.

Variations of the Needle in Iron Ships.

There is in Liverpool a Compass Committee who are making researches in the variation of the needle on iron ships. They are collecting many curious facts, and in a recent report make the following statement in relation to the steamer *City of Baltimore*:—

The azimuth compass of this vessel, which is placed about four feet above the deck-house, nearly 11 feet above the deck and about 30 feet before the mizen-mast, when the ship's head was placed north, correct magnetic, showed a deviation to the west of 7° 30′; when she was heeled 10° to starboard, the deviation was 25° 30′ to the west; and when she was heeled 10° to port, the deviation was 15° 30′ to the east; showing a difference of 41° due to heeling alone, without in any way changing the direction of the ship's head, or an average of 2° of deviation for each degree of list. It will be seen that the deviations occurred when the ship's head was to the north. Considering that all our steamers carry canvas, and that with a fresh breeze they must heel over to some extent, it is important to understand that in steering a north or south course, the variation is considerable, but that there is little or no deviation on a west or east course. The committee sought for an explanation of this magnetic polarity of Mr. Bennett, a compass adjuster, of Cork. He discovered that in his locality, the vessels had been built on the northern shore of the river, which runs east and west. Vessels had, therefore, been built in the line of the magnetic meridian, and the ships exhibited southern polarity aft and northern polarity forward. Mr. Bennett thereupon prevailed upon Mr. Robinson, the builder, to construct a ship with her head to the south, and launch her stem on. The polarity in this vessel was reversed. When her head was east and west, a compass placed aft had much less error than in any former ship, and much less than in the forward part of this ship, and consequently it required less magnets to adjust her. As a deduction from this natural law, Mr. Bennett advises the keels of ships to be laid east and west.

Length, Weight and Measure.

The French standard of length in the meter, which is one ten-millionth of the distance from the equator to the pole; it is equal to 39.37079 inches, or very nearly 3.281 English feet. One mile contains 5,280 feet, or 1,760 yards. The acre contains 43,560 square feet. One mile square contains 640 acres. The circumference of a circle is equal to the diameter multiplied by 3.1416. The area of a circle is equal to the square of the diameter multiplied by 0.7854. The United States standard gallon contains 231 cubic inches; and the United States standard bushel contains 2,150.52 cubic inches. A cubic foot of water weighs 62.5 lbs.; a foot of hard wood, green, 62 lbs., air-dried, 46 lbs., kiln dried, 40 lbs.; a foot of soft wood, green, weighs 58 lbs,, air-dried, 30 lbs., kiln-dried, 28 lbs. A cubic foot of cast iron weighs 450 lbs.; of wrought iron, 480 lbs.; coke, 50 to 65 lbs.; coal 75 to 95 lbs.; sandstone, 140 lbs.; granite, 180 lbs.; brickwork, 95 lbs. No. 1 iron is 5-16 inch thick; No. 3 is 9-32 scant, No. 4 is 1-4 inch; No. 5 is 7-32, and No. 7 is 3-16 inch thick.

A GOOD SUGGESTION.—A writer to a London paper proposes that the £200,000, which it is thought the different Prince Albert memorials will cost, be devoted to buying American sewing machines for the twenty thousand poor needlewomen in England. The correspondent in conclusion says: "I have no connection with sewing machines, and am by no means wedded to them. Other forms of benevolence and beneficence—dear twin-sisters—may be much to be preferred. Almost any thing is better than calf worship."

A THIEF lately stole from a church in Genoa the sacramental service, and, taking it home, tried to melt it down in a brazier. While at the work he was overpowered by the fumes of the charcoal; his cries for help brought people to the spot, who thus observed his occupation and discovered the theft.

FLEAS IN DOGS.—I have found, says a correspondent, the following receipt most effectual in killing fleas in dogs, viz., to rub them well over with whisky—it acts like magic, killing them *instanter*; if all are not polished off in one application, another will be necessary.

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Correspondence

Some Magnetic Experiments.

BY B. FINCKE, M. D.

1. Electro magnetic Action of the Human Body.—100 yards of copper-wire No. 30, covered with cotton and shellac, are coiled upon a wooden frame, and an astatic needle, consisting of two No. 7 sewing needles, magnetized and joined about one inch distance with a piece of wood, is delicately hung up in the open space, left for this purpose, by a silk-fiber seven inches high. Between the upper needle and the wire a dial with circular measure is interposed. The coil is fastened into a square wooden box, and closed with a glass bell against the current of air. The ends of the wire leave the box near its foot, and a handle of sheet-zinc is attached to the inner end, another one of sheet-copper to the outer end. The instrument is put on an immoveable stand fixed to the wall of the building, and the wire-ends are fastened in such a manner, that the grasping of the handles does not disturb the needle. The coil stands continually in the magnetic meridian, determined by a single needle. The astatic needle takes a more or less equatorial position, the upper north-pole usually pointing north-east. No disturbances of this needle have been observed so far, and if any should occur, they can be controlled by another double needle hung up for the purpose of observing magnetic disturbances in another room.

The galvanometer shows the following strength. If the naked ends of the wire half an inch apart are immersed one-eighth of an inch into one dram of distilled water contained in a flat watchglass, the upper north-pole shows a northern deflection of 2° 30′ from its position north-east. If the inner end of the wire is armed with one sixty-fourth of one grain of zinc and immersion takes place in the same manner, a northern deflection of 5° follows. If one drop of sulphuric acid is added to the water, and the naked ends are immersed as above, the deflection toward north is 5°, and, if the inner end is armed with zinc as above, and the ends are immersed as described, the deflection in northern direction amounts to 300°, and generally more. The deflection increases still more, when the upper north pole stands south of the equator, and then is of the southern direction.

The electromagnetic action of the human body upon this multiplier is shown by the following simple operation. The person to be experimented upon grasps the handles in his hands and holds them until the maximum of deflection of the needle is reached. The deflection ensues, and varies according to the different personalities and their momentary conditions. Sometimes the needle will not move at all, or very slowly a few degrees, and sometimes a rapid rotation through the whole circle and more ensues. The other day, immediately after having done some handiwork, I got a rotation of four circles.

This experiment promises to become a valuable aid in the estimation of the conducting power of the nervous system, as also in the examination of various secretions and excretions of the human body, objects of importance in physiology, pathology, and therapeutics. And I do use it in fact for the purpose of diagnosis.

2. Magnetic Paradox.—On operating with the astatic needle in the above described apparatus, some curious facts were elicited, which seems to demand explanation.

Some cut iron nails, presented with their head or point to a single oscillating magnetic needle, invariably attract either north or south pole. If, however, the heads of such nails are pointed towards the upper north pole of the astatic needle, the north pole is repelled to a quarter of a circle and more. The same occurs whether the single or the double needle first be tried. In fact, those nails prove indifferent to a single needle and polar to a double one. This observation moreover is corroborated by testing upon another astatic needle of different size and proportion. The same phenomenon has been observed with other pieces of iron which I happened to try, such as soft iron-wire, cast-iron, cast-iron screws, forged iron, &c.

Curiously enough, I found some other pieces of iron such as cast-iron nails, sewing needles, watch-spring, and a piece of iron rod, all of which repel the upper north-pole of the above described astatic needle, attract the upper north-pole of another one, and equally attract north and south-pole of the single needle.

3. Direct Magnetic Action of the Human Body.—A gentleman of considerable mesmeric power, single, 32 years old, had drawn my attention to this subject, after he had noticed several times and shown to me, hat a pair of scissors, he inclosed in his hands for a minute or two, deflected the needle of a delicate pocket-compass visibly more, than it had done before.

Nov. 7, 1861.—The same gentleman pointed his right forefinger directly toward the upper north-pole of the above described astatic needle as near as the covering would admit without touching it, while at the same time I grasped with both my hands his left hand, and thereupon followed a distinct deflection of 5°.

4. Difference of Momentum between the opposite Poles of Magnetic Needles.—Before I hit upon the new magnetometer described in No. 25, Vol. V. of the Scientific American, I tested small magnetized needles upon a common single rhomboidal needle by presenting both respective north-poles to each other. The deflection of the oscillating needle would give the desired result. On applying then the south-poles to one another, it was observed, that the deflection amounted to 20° more than before, at the north-pole. Similar observations were made upon the astatic needle, one of which is mentioned above in subject No. 1.

It appeared to me singular, that the south-pole should swing further, than the north-pole on application of the respective poles of one and the same needle, since not only the needle is carefully poised on the pivot, but also the one end moved of course has to carry the opposite end in equal ratio. This leads to the following reasoning.

The rhomboidal needle is broader in the middle than at both ends. The angle of inclination is by this arrangement diminished and almost neutralized, because the gravitation of the central portion by far surpasses the amount of inclination, so that it escapes direct ocular observation. There is, however, probably, an infinitesimal angle of inclination left, if the needle is correctly poised in the middle, which may account for the difference in momentum. The south-pole, therefore, is actually more remote from the center of rotation by the moment of inclination, and swings round with a corresponding centrifugal force, greater than that of the north-pole on application of the soliciting south-pole of the testing magnet.

The needle, then, resembles a lever of the first kind, the deflection of which is inversely as the sines of the respective arcs on application of an equal force upon either pole, and the consequence is, that the moment of the south-pole increases with the angle of inclination of the north-pole.

Brooklyn, N. Y., May 16, 1861.

Experiment with Steel-Pointed Bullets.

Messrs. Editors:—I noticed in a late issue of the Scientific American a communication advocating the use of lead for cannon projectiles. Just before, I had been engaged in trying an Enfield rifle, carrying a conical ball 14 to a pound, at a target consisting of 2-inch plank, defended by one plate of half-inch cast iron and another of cast steel of about one-eighth of an inch, placed at an angle of about 40°, at a distance of 40 yards. In accordance with an idea which struck me after reading an account of the "Battle of the Monsters," I furnished several of the bullets with sharp steel points, like a punch or cold chisel. Only one of the bullets which were not pointed penetrated the cast steel (the others glancing off), and that not until it had furrowed it for several inches and came in contact with the edge of the cast iron. The pointed bullets, on the other hand, penetrated both plates and one inch of the plank.

It seems to me that a point of well-tempered steel would do away with the objection to the softness of the metal, and that such a projectile would be the least likely to glance off from inclined iron plates.

C. W. H.

Charlottetown, Prince Edward Island, April 19.

The Plan of Taxing Money Receipts.

Messrs. Editors:—I do not suppose that it will amount to any thing, but you will pardon me for addressing you to say how much I was pleased with an article on page 307, last number, Scientific American, on taxation. I have read with much interest different articles that have appeared on this subject, and also the proceedings of Congress, but none have seemed to me to reach the main object in so easy a manner as the one above alluded to, viz., the collection of a sufficient revenue to carry on the government without oppressing the people either really or apparently. I was living in Maryland while the stamp tax, as it was called, was in operation. This was something similar to your proposition, but referred more particularly to promissory notes, sales of property, &c. It did not include receipts for moneys. My recollection of it is that the people did not find it at all oppressive, because it fell on those that were best able to bear it. I should be much pleased to see you elaborate your proposition more fully, and bring it before the public in such a way that shall receive the attention it deserves. These stamps or notes, bills, receipts, &c., could be distributed over the country, by means of the post offices, with comparatively little expense.

Allow me, also, to embrace this opportunity of congratulating you on the continued and unwearied excellence of your paper during these troublous times. I have been a subscriber from the second year of its existence, and at no time have I been more interested in the different numbers than during the last winter and spring. Not one of them but what I find more knowledge and instruction in than could be purchased elsewhere for the price of a year's subscription. John Oliphant.

Fairchance Iron Works, May 14, 1862.

The Motion of a Rifle Ball.

Messrs. Editors:—It is a disputed point with some as to whether a long or Minié-shaped ball, shot from a rifled cannon at any proposed elevation, maintains its polarity so that when it strikes the object it will have its point elevated to the same extent that it was when it left the gun, or whether it will keep precisely point foremost as it passes through its curve, so that at a great elevation it will fall with its point as much depressed as it was elevated at the start. Those who think that its longer axis will remain parallel with the bore of the gun, contend that it is held in position by the principle that the gyroscope is intended to illustrate, or that keeps a boy's top standing on its point while the center of gravity is at one side of the base. Those who take the other view give it as conclusive that they have tried the experiment—that they have been at camp and have seen cannon, and have heard the gunners and officers say that it was just as they state it, and that if it were not so it would spoil all their calculations of gunnery.

Please give your opinions in the Scientific American, with such illustrations as all can understand. Supposing the gun, in order to throw the shot to the proper mark, say a side of a fort, requires an elevation of 45°, will it strike point up 45°, or point down at the same inclination, or will it accommodate the gunner by striking at right angles with the shorter axis of the bullet? W. E. Lukens.

Sterling, Ill, April 28, 1862.

[There is no doubt that the tendency of a rotary motion in a body is to preserve its axis parallel to itself, and if this tendency is not overcome by other forces, it will always hold a projectile discharged from a rifled cannon with its axis parallel to that of the gun, as illustrated on page 234, Vol. IV. Scientific American. But if the center of gravity is much forward of the center of mass, as in the case of a wooden arrow with a metallic head, the resistance of the air will turn the projectile so that its axis will be nearly parallel with the line of flight.—Eds.]

Yield of Lake Superior Copper Mines.

Messrs. Editors:—I take the liberty to send you a statement of the product of the copper mines of Lake Superior for four years, commencing with 1858:

In 1858 the product was	5,942 tuns.
In 1859	6,041 tuns.
In 1860	8,614 tuns.
In 1861	10,337 tuns.

The above statement may be relied upon as correct.

A. A. B.

Eagle River, Lake Superior, April 16, 1862.

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Spontaneous Generation.

The following account of the researches of Pasteur, respecting the theory of spontaneous generation, was translated and condensed for the *American Journal of Science and Art*, by M. C. White, M. D.:—

The theory of spontaneous generation was long since proposed to account for the origin of beings whose germs were too minute or too obscure to attract attention. One after another the different organisms supposed to arise from spontaneous generation have been proved to originate from germs. At present the question of spontaneous generation concerns only the origin of *entozoa* and those minute organisms which can be studied only with the aid of the microscope, as molds (minute fungi) and infusoria, both animal and vegetable. The common theory that the spores or germs of these minute organisms are constantly floating in the atmosphere ready to start into activity whenever they meet with a suitable nidus, has found an able advocate in M. Pasteur, of the Normal School of Paris, who has published in the *Comptes Rendus* a series of valuable papers on this subject, the substance of which I have translated.

In order to collect and examine the solid particles floating in the atmosphere, Pasteur placed soluble gun cotton in a glass tube, and, by means of an aspirator, caused a current of atmospheric air to pass through it for several hours. The cotton was then dissolved in a mixture of alcohol and ether, and the atmospheric dust deposited at the bottom of the fluid in a conical glass was examined in the microscope. The sediment thus collected contained grains of starch and such other dust as is ordinarily found on surfaces exposed to the air. When submitted to the action of concentrated sulphuric acid, the starch was soon dissolved, while other particles remained undissolved and had all the characteristics of the spores of ordinary mucedines, which are known to resist the solvent properties of concentrated sulphuric acid. [It is worthy of notice, that certain minute fungi are capable of decomposing a solution of sulphuric acid. A few years since, a little mold developed in the solution of sulphate of copper, used for electrotyping in the department of the U. S. Coast Survey, at Washington, proved an intolerable nuisance. It decomposed the salt, assimilating the sulphuric acid, and rejecting the copper which was deposited around its threads in a metallic form. From this it appears that sulphuric acid does not prevent, but may rather assist the growth of certain fungi.—*Tr.*]

To determine the action of atmospheric air, and of atmospheric dust upon fermentation, putrefaction and the appearance of organization, Pasteur adopted the following methods:—

A flask was about half filled with a fluid consisting of water, containing in solution about ten per cent of sugar and from two to seven parts in a thousand of the scum of beer. The neck of the flask was drawn out in the flame of a lamp and attached to a platinum tube, $\frac{1}{25}$th of an inch in diameter, which was then heated to redness. The fluid was boiled for two or three minutes to expel all air from the flask, when it was allowed to cool very gradually, and as it cooled the air which entered the flask was calcined, and all organic germs it contained were destroyed by passing through the red-hot platinum tube. When the flask had thus cooled to the temperature of the surrounding air the neck was hermetically sealed. The flask was then removed to an oven, and kept at a temperature of 80° or 90° Fah., for an indefinite period, without producing any organisms, or undergoing any change whatever.

To test the influence of atmospheric dust upon a fluid thus hermetically sealed, Pasteur placed a pledget of cotton or abestos in a small tube, and caused a current of common air to pass through it by means of an aspirator. This small tube, containing the cotton or asbestos, loaded with atmospheric dust, was then transferred to a larger T-shaped tube, one end of which was connected by india rubber with the sealed flask, another end was connected with a platinum tube heated to redness, and the third being connected with an aspirator, the apparatus was easily charged with calcined air, and all the common air was expelled. The neck of the flask was then broken within the T-shaped tube, and the small tube containing the atmospheric dust was passed into the flask, with access only of calcined air. The neck of the flask was then again hermetically sealed by means of the blowpipe. Many flasks were prepared in this way, and in every case, after standing in a warm situation for from twenty-four to thirty-six hours, vegetation appeared in the same manner as if the contents of the flask were exposed to the open air; but the mold or mucedines appeared first in the little tubes carrying the cotton, which was often thus filled to its extremities. The organic growths which appeared were the same as in flasks exposed to the open air, viz., of infusoria, *bacterium*; of mucedines, the *penicillium*, *ascophora*, *aspergillus*, and some others. When calcined asbestos alone was introduced no vegetation appeared.

It was thus demonstrated that amongst the dust suspended in ordinary air there are always organized corpuscles, and that these powders, when mixed with a suitable liquid, in an atmosphere of itself inactive, give origin to *bacteria* and *mucedines*, such as are furnished by the same liquid in the open air.

Pasteur confirmed these results by another method. Similar quantities of the same fermentable liquid were introduced into a series of flasks in all respects alike. The necks of the flasks were all drawn out over the flame of a lamp, and bent into a variety of different forms, but the tubular neck of each flask was left with an opening $\frac{1}{25}$th of an inch or more in diameter. In some of the flasks the liquid was boiled for several minutes, but three or four were not heated to the boiling point. All the flasks were then set away in a quiet place, free from currents of air. After twenty-four or forty-eight hours, according to the temperature, the flasks in which the liquid was not boiled after being put into them (although all the liquid had been boiled before it was put into the flasks) were found to be troubled and covered little by little with mucor. The liquid which had been boiled in the flasks remained limpid, not only for days, but even for entire months, although all the flasks were left open. There can be no doubt that the curves and sinuous forms of the necks served to secure the contained fluid from the fall of germs.

The common air entered these flasks as they were cooling, but so slowly during the gradual cooling of the hot liquid that the germs were either destroyed by the heat or were deposited in the curvatures of the narrow necks of the flasks, so that no viable germs reached the liquid. When the neck of one of these flasks was broken off, and the remaining portion placed vertical, in a day or two the liquid became moldy or filled with bacteria. This method, which so well explains the preceding, and which can be so readily practiced by any one, carries conviction to unprejudiced minds. It gives also peculiar interest to the proofs which it presents to us, that there is nothing in the air except its dust, which is a condition of organization. It thus appears that oxigen acts only to sustain life furnished by germs, while of gas, fluids, electricity, magnetism, ozone, things known or unknown, there is nothing in the air, except the germs which it carries, which can originate organic life.

[To be continued.]

Improvements in the Oxy-hydrogen Light---The Magnesia Light---Arborescent Crystallization on Photographic Plates.

[From the Photographic News.]

Some improvements have recently been made in the oxy-hydrogen light, which cannot fail to be of value to photographers. One objection to the employment of this light for photographic purposes, is the very feeble amount of chemical rays which it emits when evolved by the ordinary means. The earth lime is universally employed as the body which is to be rendered incandescent by the heat, and this is about one of the worst agents for actinic purposes which could be employed. Mr. Fryer has lately been making a series of experiments with this light, with a view to determine what substance, when made incandescent, produces the greatest amount of light. He has operated on various salts of calcium, magnesium, strontium, barium, and also upon some other substances. The best results were obtained from magnesium compounds. The sulphate of magnesia, when baked, was found to yield a bright light, but was decomposed by the heat; and the sulphurous acid escaping, was very unpleasant. Calcined magnesia succeeded the best of all; but when the powder was used, the gases blew it away. When the powder was mixed with water and afterward dried, the cake was friable; and when the dry powder was pressed into a mold, by means of hydraulic pressure, the cake split up into laminæ when subjected to the current of ignited gases. After many experiments with the materials in different proportions, it was found that sulphate of lime one part, and calcined magnesia two parts, mixed with water and modeled into a cake and dried, produced the best results. This, however, is not all that could be desired, as in time the cake becomes cracked and fissured by the gas. The illuminating power is exactly double that of lime, the ratio being, pressure and volume of gas being equal, as 54 is to 27. The experiments were conducted with oxygen, and the coal gas supplied to Manchester. The jet used was a form supplied by Mr. Dancer, a jet of oxygen being surrounded by an annular jet of the coal-gas. Mr. Dancer has further improved the jet by allowing the oxygen pipe to project beyond the hydrogen, and by not contracting the aperture of the hydrogen, or coal-gas pipe. At the last meeting of the Manchester Literary and Philosophical Society, Mr. Fryer exhibited this light; its effect is said to have been very striking.

Some remarkable appearances of crystallization have been noticed by Mr. Petschler in the preparation of glass plates with bichromate of potash and gelatine, for photographic purposes. The striking peculiarity is, that the inorganic salt in contact with the organic matter produces vegetable forms; specimens on glass plates representing mosses, ferns, and algæ in beautiful ramifications, which vary in many ways, dependent upon the strength of the solution, temperature, state of the atmosphere, and other causes. The plates were prepared in different ways. Some were first coated with collodion, on the surface of which a hot mixture of gelatine and bichromate of potash was poured, and then allowed to cool and dry spontaneously. In a few hours the crystals began to form and ramify themselves over the plate. The gelatine mixture was composed of three parts of gelatine and water, twenty grains to the ounce, to one part of a saturated solution of bichromate of potash. Several other plates were prepared in which the order of application of the ingredients was varied, or some of them omitted, all of which gave beautiful, tree-like crystalline forms. The great variety and beauty of these vegetations must be seen to be appreciated, as they can with difficulty be represented by drawings. Mr. Petschler believes that no chemical combination takes place between the salt and the gelatine, but that the latter acts simply as a medium. The gelatine, when firm, retains a certain quantity of water; but when the moisture is driven off by heat, the crystallization is suspended. There is great similarity in appearance, and there is, possibly, some connection in cause between these arborescent crystallizations and the ramified form in which the salts of some metals are found naturally in agate, slate, and even trap rock, where the oxide of manganese is frequently found to have assumed similar forms. Mr. Mosley has suggested that the arborescent appearances might, perhaps, arise from the density of the solution, from the resistance of the gelatine to allow of crystallization in the usual rhombic form, and possibly to the subtle electrical or galvanic action supposed to be excited during crystallization. He has stated that some years ago he obtained from a solution of bichromate of potash, tree-like forms with spreading branches and pendent rhomboids, which, under the polariscope, appeared like a tree with gems of rich colors for fruit.

The arrangements for the conveyance of the water from Springhead to Stoneferry, England, have now fairly got into operation, under the superintendence of Mr. Dale, the engineer. About three hundred yards of the trench have already been made, and in digging, at the depth of about ten feet from the surface, a boat has been discovered lying right across the trench. The boat is of oak, and is evidently a Roman relic, and must have been buried for at least a thousand years.

A French naval officer holding a high command has tendered his resignation, in order to devote himself to the completion of a new fulminating spur which he has invented for iron-cased ships, which will not only drive in the side of any ship, but will lodge in its interior an explosive shell of the most dangerous character.

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Improved Breech-Loading Gun.

The accompanying engravings represent a very effective breech-loading gun, recently invented by Henry Berg, of Davenport, Iowa; Fig. 1 being a side elevation, Fig. 2 a vertical longitudinal section, and Fig. 3 a horizontal section. A is the stock and B the breech, which are rigidly connected together. Movable face plates, C, cover the breech on each side. D is the barrel, provided with arms, d d′, by means of which it is pivoted to the breech. E is a horizontal bolt, passing through a slot in the breech, which slot is narrow horizontally, so as to confine the bolt endwise of the gun, but wide vertically, to allow play to the bolt in that direction. *e e* are flanges formed upon the bolt, E, near its ends, and fitting in eyes at the ends of the arms, *d d′*; the said flanges being eccentric to that portion of the bolt which fits within the slot of the breech, a rotation of the bolt will move the barrel forward or backward.—This rotation is effected by means of a lever or crank, F. *f* is a spring catch, which retains the lever, F, in either position. The front of the breech is formed with a circular flange, *b*, fitting in a corresponding annular groove or socket in the rear of the barrel, in order to form a tight joint when the barrel is drawn back into position for firing.

Fig. 1

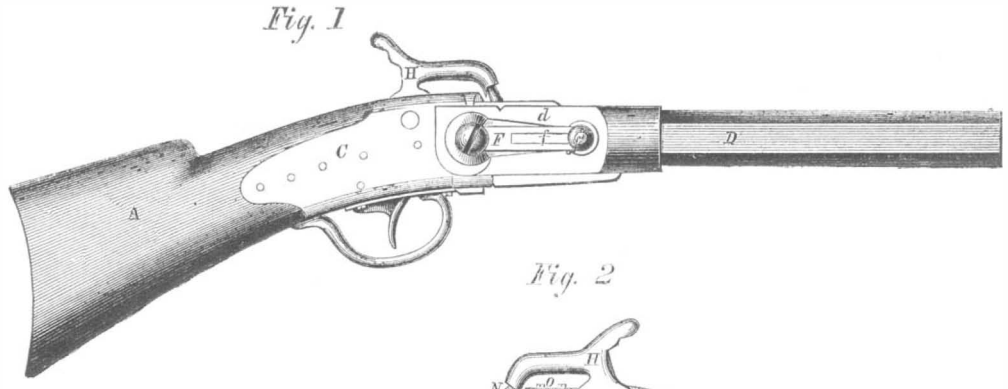


Fig. 2

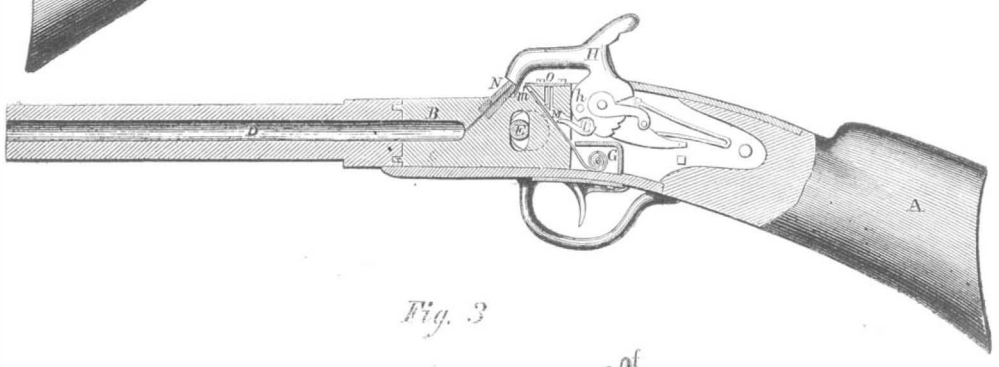
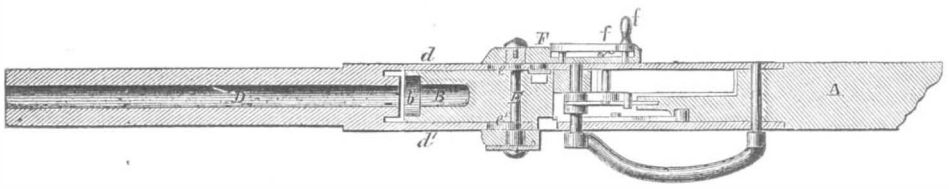


Fig. 3



BERG'S BREECH-LOADING GUN.

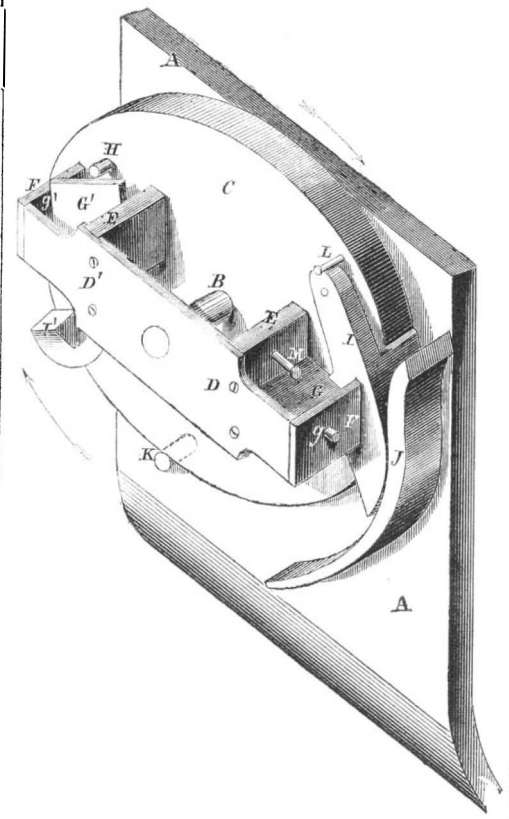
The main portions of the lock being of common construction require no description. The hammer, H, is also of common construction, but is provided with a stud or pin, *h*, projecting horizontally from it, for the purpose of raising it by the action of the barrel. G is a chamber to contain tape priming, which extends up through a passage, M, to the nipple, N. L is a feed band, pivoted to the lower part of the hammer stock, and employed to forward the priming up the passage, M, at every elevation of the hammer. *m* is a cutter upon the hammer, which severs a suitable piece of the priming at each stroke. O is an adjustable-elastic plate, fitting over the orifice of the passage, M, but movable, so as to permit the withdrawal of the priming when desired.

The manner of using the arm is as follows:—The parts being in the position shown in Figs. 1 and 2, (which is the position for firing) if it be desired to load the piece, the finger and thumb are applied to the pin, *f′*, of the crank lever, F, and the catch, *f*, at the same time is retracted by a slight pressure. The lever is then drawn up and over to the position shown in Fig. 3, which, by the action of the eccentrics, *e e′*, throws the barrel forward. The barrel is then allowed to fall back over the shoulder of the operator, in a position at right angles with the breech, the latter being held in a vertical position to receive the charge. The charge being inserted in the breech, the latter, with the stock to which it is attached, is restored to a horizontal position, and the barrel falls by its own weight to a line with the breech, in the position shown in Fig. 3. This descent of the barrel raises the hammer to full cock, through the medium of a lever engaging beneath the pin, *h*, of the hammer. At the same time the feed band, L, being, by the motion of the hammer, driven up the passage, M, carries forward the tape priming, causing it to project over the nipple. The hammer may be cocked by hand, in customary manner, if preferred, and, by means of a sliding catch, the parts may be disconnected so that the movement of the barrel will not act upon the hammer. The tape priming can be withdrawn at any time and percussion caps used in its place.

With this invention the entire operation of loading and firing can be readily performed with one hand, by resting the barrel over the arm or shoulder; it is, therefore, of great value in carbines for mounted service, but is applicable, also, to other arms. It is claimed to excel both in rapidity and accuracy of firing.

A patent for this invention was procured through the Scientific American Patent Agency, March 25, 1862. Any information as to the sale of rights, or other matters relating to the invention, may be obtained by addressing the inventor, Henry Berg, Davenport, Iowa.

KEPNER'S FEATHERING PADDLE WHEELS.



Various expedients have been devised to relieve the buckets of paddle wheels from the injurious vertical resistance experienced from the water at the back part of the stroke. The annexed cut represents a simple and effective device involving less waste of power than most contrivances for this purpose. It operates in connection with a pivoted bucket holding the said bucket rigidly during its downward and backward movement and relieving it the instant it begins to ascend, so as to permit it to assume a position in which it will pass through the water with the least possible resistance.

A represents a portion of the side of a vessel. B is a shaft carrying a disk, C, and radial arms, D D, connected to the said disk by bars E and F, which are parallel with the shaft but at different distances therefrom, the bars, F, being at the extreme periphery of the wheel, as shown. G G are buckets adapted to turn upon radial pivots, *g g*, which pivots are placed somewhat nearer to the arms, D D, than the disk, C. Pins H (one shown) project from the face of the disk, C, in such position as to receive and sustain the inner or longer ends of the pivoted buckets as they fall into position on the descending side of the wheel. I I are gravitating latches by which the buckets are held in their closed position during a proper part of their revolution. J is a segmental cam fixed to the vessel's side concentrically with the wheel and employed to hold the gravitating latches, I I, inward upon the buckets. K is a stationary pin employed to throw the latches outward in order to release the buckets at the proper time. L are pins (one shown) which support the latches, I, when thrown off the buckets. M are pins (one shown) which support the buckets so as to prevent them falling too far outward to admit of their returning to a closed position by their gravity, at the proper moment.

The operation of the wheel is as follows:—As each bucket begins to descend it falls into a closed position and its latch, I, falling over it and passing within the segmental cam, J, secures the bucket firmly against the action of the water. The bucket is thus held in the most effective position during such part of its revolution as it can act advantageously, but immediately that it begins to ascend, or reaches a position where the force exerted upon the water will not be so directly applied to the propulsion of the vessel, the latch, I, passing under the fixed pin, K, is thereby thrown from the bucket and the latter swings back to such a position as to adapt it to pass upward through the water with the least possible resistance. The pins, L and M, are so placed as to prevent the latches and buckets falling back too far and to support them in such positions that the buckets first and the latches immediately after, will return to the closed position by their own gravity as they begin to descend. The bucket, G, and latch, I, show the closed positions and the bucket, G, and cord, I, the open. The constant lubrication afforded by the water causes the device to operate with less friction than might appear at first sight. In the engraving but two arms and buckets are shown. In practice they will of course extend completely around the wheel. Arms may also be substituted for the disk, C, if prefered.

A patent for the above was procured through the Scientific American Patent Agency on the 15th of April, 1862. It is the invention of Solomon Kepner, of Pottstown, Pennsylvania, of whom further information may be obtained.

REMEDY FOR BRONCHITIS.—The following is given as an excellent remedy for bronchitis:—Take common mullin leaves, dry and rub fine, and smoke them three or four times a day in a new pipe, taking care to draw the smoke well into the throat.

WITHIN the past ten years 1898 new streets have been opened in Paris.

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VOL. VI. NO. 22.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, MAY 31, 1862.

EXTENSION OF PATENTS---FOR WHOSE BENEFIT THEY ARE GRANTED.

There seems to be an impression among inventors that, since the law of March 4, 1861, went into force the previous law in respect to extending patents for seven years was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861, may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1848 and 1849 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension; it must be done at the instance of the inventor, for whose sole benefit it is granted.

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THE BEST GUN.

As the uncertain position of our foreign relations will probably arouse Congress to adopt the measure so long urged by the officers of our engineer corps—the providing of very heavy guns for our sea-coast fortifications—and, as the measure will involve a very large expenditure, it is important that the best gun known at the present time should be adopted. It seems to us that by selecting the valuable features of the several inventions which are presented, a gun may be formed better than any that has yet been made. There are three kinds of cannon now in use in our service, each of which has some advantages peculiar to itself, and we do not see why all of the advantages cannot be combined in a single gun.

The Rodman gun, made of cast iron which is cooled by a current of water circulating through the core, has advantages of strength and durability manifest to theory, and that have been most conclusively confirmed by experience.

The Parrott gun, formed by reënforcing a cast-iron core with hoops of wrought iron, has the same theoretical advantage as the Rodman gun, with the superiority of greater tensile strength in the exterior hoops.

Dahlgren's last plan, of casting the gun without trunnions, and securing these to the piece by hoops and breech bands, obviates the serious objection of angles and corners in cast-iron cannon.

Now, why would it not be wise for the Ordnance Department of our army to try a gun cast hollow by Rodman's method, but without trunnions on Dahlgren's plan, and then to reënforce the breech with hoops coiled and welded on Parrott's system? It may be that the wrought-iron hoops will receive a permanent set from the momentary expansion of the core at the instant of discharge, or the several systems may be in some way incompatible with each other, and the Department would, of course, have a few guns thoroughly tested before proceeding to construct the many hundreds that will be required for all of our forts. We throw out the suggestion, having confidence from the previous history of the Department that no prejudices will prevent the adoption of any invention, either domestic or foreign, which will tend to promote the efficiency of our artillery.

PROPOSED AMENDMENTS TO THE CANADA PATENT LAW SYSTEM.

A bill is now pending before the Canadian Parliament for the protection of British and foreign patentees, and to encourage arts and manufacturers. It contains liberal and enlightened provisions, and should it become a law it will relieve our provincial neighbors of the charge of illiberality toward inventors of other nations. As the Canadian statutes now stand a person in order to secure a patent *must be a resident subject and the inventor of that for which the patent is sought*; thus effectually closing the door against all foreigners, without distinction, and leaving Canadian subjects free to appropriate whatever they can lay hands on from the inventors of other countries. The injustice of this system is plainly manifest, and very naturally soured our inventors against their unreciprocal neighbors. The bill now before us is designed to sweep away this unjust system. It provides that any person, or the assignee of any person, who has obtained a patent for an invention in Great Britain, or the United States, or any foreign country, for a new and useful invention or composition of matter, shall, upon the production of the proper papers, be entitled to Letters Patent in the Canadas, which shall remain in force until their expiration in the foreign country where previously obtained. The fee to be required is thirty dollars. We cannot conjure up a single good reason why this bill should not become a law without delay or opposition, and we trust its mover, Hon. Mr. Moore, will not flinch in urging its speedy passage.

By the act of March 2, 1861, our patent laws were amended so as to place inventors of every nationality on the same footing as to fees with our own citizens, *except such countries as discriminate against us.* This virtually shuts out Canadians—unless they pay a fee of $500—simply because they discriminate against us. If it is assumed by the opponents of this reform that the old system is best, because it leaves resident subjects free to patent whatever they may chance to discover themselves, and also to roam through the domains of foreign science and arts, we reply that the argument is unsound, and has so proved in the history of the Canadian Provinces. It is also dishonest, as it evinces a desire to take and use that which properly belongs to another; and thus encourages a species of piracy which our neighbors would not wish to have practiced upon themselves.

It may be true that some comparatively insignificant improvements may have found their way to the Provinces from the States, but we have yet to learn that a single valuable improvement patented here has been manufactured there. Our enterprising inventors and manufacturers want protection for their discoveries, and until that is tendered to them they will not strive to introduce their improvements against the probability of a future open competition.

We fear this bill will fail, but we hope not, and we urge upon Canadian legislators not to ignore this wholesome reform, but to hurry it forward to a wise consummation.

THE GREAT TROY FIRE---IRON SAFES DESTROYED.

Our readers are aware that the enterprising city of Troy has recently been visited with a most destructive conflagration. It burned over from fifty to seventy-five acres of ground, and consumed, in its ravages, upward of $3,000,000 worth of property. Bankers, merchants and housekeepers have hitherto been accustomed to trust their valuables to the custody of iron safes, but it now appears that too much reliance should not be placed upon the perfect fire-proof qualities of these safes. A valued correspondent, residing in Troy, who is fully conversant with the scientific facts in the case, writes us as follows on the subject:—"The fire was one of the largest that has ever occurred on this continent, and, allow me to advise you, as you are in the habit of keeping valuable papers in your safe, not to be too confident in the protection which it affords. Hardly a safe standing out uninclosed by brick has passed through the fiery ordeal. Troy is, as you know, a great place for manufacturing safes, and the thing is being hushed up and kept out of the newspapers, but the fact is, the safes standing isolated in a building are little protection. I have seen three opened within a day or two, and none of them had a paper legible inside. The wood work was pretty much all burned up—one safe, which I did not see, was opened before it had got perfectly cool, and the owners had the satisfaction of seeing the charred contents entirely burn up upon the admission of air. The fact is the safe makers have departed from the original idea of filling the safe with plaster of Paris, which is the only thing which will answer as protection. The value of this is shown by the fact that you cannot boil water in a tin pan, thinly coated with plaster, over a hot fire."

GENERAL TOTTEN ON THE SHIP AND FORT QUESTION.

General Totten, who is at the head of the Engineer Corps of the United States Army, and who is as competent to give an opinion on the subject as any person in the world, has just given a brief statement of the present relations of ships to land fortifications. It will be seen that his positions are precisely the same as those taken by the SCIENTIFIC AMERICAN, the *London Quarterly Review*, and all European and American engineers who have kept informed in regard to the subject. Our military engineers have been urging the department for years to provide guns of much larger caliber for our sea-coast fortifications, and we trust that recent events will stimulate Congress to delay no longer this measure of vital necessity. It was probably fortunate that the step had not been taken before this rebellion, as it is owing to their feeble armament that we are enabled to recapture the fortresses seized by the rebels; but in order to hold them against both domestic traitors and foreign foes they ought to be armed immediately with a 15 or 20-inch gun at every embrasure.

General Totten states the principles which have been established by experience, and these furnish a safe guide and firm basis for inventors seeking to devise further improvements.

The following are General Totten's positions:—

1. That the plans of our seaboard batteries are of the simplest character and cannot possibly be improved.

2. That the materials being the strongest, most indestructible, imperishable and cheapest possible, no change can be made in them with advantage.

3. That iron has been freely used for years past to guard the thinnest and most exposed part of these batteries, and its further use is perfectly easy on the existing works to any extent, and is a question of economy merely; it will be applied whenever needed; the walls may be entirely iron covered.

4. That all the changes in ordnance and projectiles are greatly in favor of land batteries, and against vessels, in any combat between the two.

5. That guns of unlimited size can easily be mounted and covered on land.

6. That no vessel can be built and floated that will not be penetrable to projectiles from such guns.

7. That one shot, rightly delivered, will probably sink the vessel, while the fort cannot be seriously injured by the return fire of the vessel.

8. That the methods of naval warfare cannot avail in such a contest.

9. That all the best results of modern science, skill and experience are incorporated with these defences as soon as these results are found to be reliable.

10. That while forts can now, as always heretofore, be readily reduced by land batteries, they cannot be reduced when duly armed and manned, by vessels.

11. That the use of steam is a very great and the only exclusive advantage which modern times has afforded to vessels.

12. That this advantage can be countervailed only by increasing the number and especially the caliber of the guns of the land batteries.

13. That the need for a full supply of guns for our forts is very great. The want of them is dangerous.

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11. That large calibers are insisted upon, and to be furnished immediately.

It is not intended, by what has been said, to dispense with the employment of floating defences for our coast at the different points where their use is advantageous.

THE WAY THE GOLD DEPOSITS OF CALIFORNIA WERE FORMED.

Lawson B. Patterson went to California early in 1849, and he has spent 12 years in mining, never having diverted his labor to other pursuits, and never having come down from the mountains until September last. Having become satisfied that the usual explanations given by geologists of the formation of the gold deposits are unsound, he has written a little book of 100 pages to publish his own ideas. Before proceeding to examine Mr. Patterson's positions, let us give as briefly as possible the usual explanations of the geologists.

If a grain of sand, equal in diameter to the thickness of four sheets of paper like this on which the SCIENTIFIC AMERICAN is printed, is laid upon a 16 inch globe, it will bear the same proportion in hight to the size of the globe that the Himilaya mountains bear to the size of the earth. The mountains and valleys, therefore, of the earth form very slight wrinkles in its surface. It is supposed that the interior of the earth is a molten mass; the solid crust of the surface not bearing so large a proportion to the whole, as an egg shell does to the whole egg. As the earth cools, it contracts in size, and the crust settles in upon the shrinking mass. This settling in is not uniform all over the globe, but large tracts go down; bending up the rocky crust around them sufficiently to form those slight wrinkles which constitute the mountain ranges and ocean valleys that seem so vast to us—the pigmy crawlers upon this whirling ball.

These changes in the surface of the earth are constantly going on, but very slowly. The coast of New Jersey has settled some four feet in the last 80 years; a portion of Sweden is rising at the rate of about one foot in a century, this movement having raised that country about 800 feet; while the bottom of the Pacific ocean is slowly going down.

Now there was a time, inconceivably remote as we count time, but comparatively recent in the vast periods of geology, when the rocks that now form the Sierra Nevada mountains and the rest of California were buried beneath the waves of the Pacific Ocean. These rocks were traversed then as now by veins of quartz, some of which contained gold. How the veins of quartz were formed, and why the gold should be collected in them, we do not propose now to consider, though it has been made the subject of profound inquiry by the ablest geological chemist in the world. The changes that have subsequently taken place are more than sufficient for a single article.

As the middle portion of the bed of the Pacific subsided, the rocks near the coast were heaved up, and thus California rose, like Venus, from the sea. Extensive, laborious and minute examinations of the surface of California, by geologists trained to the difficult art of observation, have shown that the country was raised by successive periods of upheaval: between which were long intervals of repose. In ascending the slope of the Sierra Nevada, terraces are found one above another which unquestionably formed, in successive and widely separated ages, the shore of the Pacific. As the rigid rocks were tilted up, they were cracked and broken; opening long channels, into which the water from the copious rains was collected, forming the rivers that flow down the slope of the mountain. At first these channels had ragged bottoms and sides, but the flow of water for centuries has worn them smooth. It has also worn them deeper, and the depth to which its ceaseless attrition has cut into the solid rock is one of the most impressive proofs that we have of the immense periods that have passed since rain first began to run in these ways.

Wherever a gold-bearing vein of quartz chanced to be broken by the upheaval or worn by the stream, a deposit of gold would be formed. Of course the formations of the several deposits would be influenced by an endless variety of circumstances. In some places the rocks would be worn by the rivers, in others by the beating of the sea. Basins would exist in which the water for thousands of years would tumble the debris of the mountains, shaking down the gold to the bottom. Then as these basins were lifted above the sea, they would become ponds to be slowly filled up by the growth of vegetation. The river channels and the basins are the "long toms" and "pans" in which nature carries on her mining operations; collecting the gold upon the ripple bars, and washing away the "tailings" to the sea.

Mr. Patterson cites in opposition to this theory two facts, one of which at first view seems to have a great deal of force, while the other seems to be in perfect accordance with the theory. He says that at Cement Hill the basin in which the gold occurs has a complete rocky boundary, so that no stream could have flowed through it. But no geologist supposes that streams ever did flow out of the bottoms of these basins. Mr. Blake, in a passage cited in Mr. Patterson's book, ranks Cement Hill among the lacustrine deposits, that is, deposits formed in lakes or ponds.

But the other objection of Mr. Patterson seems to have more weight; this is that the rocks of the river banks are not worn smooth as they would be had they been cut through by the action of water. We have no doubt, however, that a more extensive observation will convince our author of the unsoundness of this objection. If he examines a water cut channel, like that in the Niagara river below the falls, he will see that the rock is undermined and broken, so that a face once smooth becomes ragged, while he will discover that wherever the ledge on the sides of the California streams is protected by a layer of clay and gravel it bears unmistakable evidences of having been worn smooth by the action of water.

Mr. Patterson's book contains some excellent practical advice to miners, and will be found richly worth its cost to all California seekers of gold. It may be purchased by sending 50 cents to the author at Boston, Mass.

PATENT LAW REFORM IN NEW BRUNSWICK.

We have advices from an attorney residing in St. Johns, New Brunswick, that at the last session of the Provincial legislature, which was prorogued a few days since, an act was passed amending the patent laws so as to allow citizens of the United States to obtain patents in that province. The law, previous to the act referred to, discriminated against all non-residents, hence our law of March 2, 1861, discriminated against residents of New Brunswick. We are happy to chronicle this excellent change in the spirit and letter of the law. It is in entire consonance with the spirit of progress which should mark the history of all nations. The benefits conferred upon mankind by inventions in the arts and sciences are universal, and their authors deserve universal recognition. The people of New Brunswick are among the most vigorous, enterprising and intelligent in all the British Colonies. A large number of ships are annually built in New Brunswick. Population about 200,000. This is an excellent opening for our inventors. For particulars about the practice under the law parties can apply at this office.

Successful Opening of the Great Exhibition---Defective Building.

The London *Engineer*, of May 2d, says:

The successful opening of the International Exhibition is a subject for gratulation. An undertaking which has aroused so much interest and no little anxiety deserves success, and nothing could be more auspicious than the opening ceremony yesterday. Whatever may be the comparisons made between the present exhibition and that of 1851, the public are manifestly preparing to come in millions, and they will certainly not be disappointed in the materials for valuable observation, whatever they may think of the general effect of the whole.

We think every engineer who has examined the structure of the building must now feel that one critical test of its strength is well over. The building is not over and above strong. It was planned by a gentleman who has exhibited the most intrepid defiance of some of the first principles of construction, his neglect to provide, in his original plans, for the outward thrust of the arches, being one example in point. Before the contractors, acting upon the ready suggestions of Mr. R. M. Ordish, had supplied extra diagonal tension rods, the main columns of the nave had gone out of plumb, and in the western annexe the visitor can still see the results of the same contempt of abutments, the wooden posts being from 12 to 16 inches out of plumb in a hight of 28 feet, the whole being held up by props in the Prince-Albert road. So, too, the breaking weight of the gallery girders is given as only 88 tuns, while it is possible to accumulate upward of 35 tuns of moving load upon them. The assigned breaking weight is, we take it for granted, the distributed breaking weight, which is twice that required as a central breaking weight. We have less fear of failure by actual overloading, however, than by buckling, or the settling of one or more of the detached brickwork piers, or the fracture of one or more of the weak lugs to which the diagonal tension rods are secured. For those who care to go through the details of the construction of the exhibition building, we may refer to the *Engineer*, Vol. XII., page 354, or to still more complete information in the current number of the *Practical Mechanics' Journal*. Few, however, we apprehend, care to spend much time in studying a notoriously imperfect model, as the building in question is—imperfect in construction as well as in architectural design. We allude to its defects chiefly for the purpose of expressing the hope that those having charge of the building will exercise every care to guard against a catastrophe, by frequently testing the truth of the columns, and watching the deflection of the gallery girders. With this we may dismiss the building, merely remarking that no curiosity on the part of a stranger to see it on the spot is likely to be rewarded by a single emotion when he arrives at South Kensington. But the centents of the building will quite atone for other defects, and to many objects the visitor will feel he can hardly return too often. In engineering and mechanical interests, especially, the display far surpasses anything of the kind ever attempted before. The machinery department, too, is the most advanced of any in the exhibition, and this fact, all who have looked into the annexe will say, reflects great credit upon Mr. D. K. Clark, the untiring superintendent of classes 5, 7, 8 and 10. Mr. Clark first assumed the duties of this post in June last, and since October he has given his whole time to it, with a success to which every visitor will bear testimony.

The western annexe is likely to be intolerably hot. With nearly two acres of glass roof, at a low elevation, and more especially with upward of a mile in length of steam and exhaust pipes ranging from 8 inches to 18 inches in diameter, and lying but a short distance beneath the floor, the temperature after St. Swithin's may be conjectured. Almost the only danger from fire, in this portion of the exhibition, would be, one would suppose, from spontaneous combustion, and we do not doubt that ample precautions will be taken to prevent any outbreak from this cause. The value of all the goods in the whole exhibition has been roughly estimated at £4,000,000, of which a large portion must be included in the annexes, almost too fragile to hold themselves upright. There must be, at least, £100,000 worth of marine engines in the building, and hardly less than £50,000 worth of locomotives. Mr. Clark has, in all, about 700 exhibitors in the classes under his superintendence, and we should suppose the average value exhibited by each was quite £1,000.

THE London *Engineer* says, the floating battery *Trusty*, fitted some time ago with Captain Coles's cupola shield for experimental purposes, has been refitted at Woolwich with the plates, seven in number, which were uninjured in the subsequent trial at Shoeburyness. The shield is again ready for the second trial, and will be fired at from Sir William Armstrong's heavy ordnance. The damaged plates, five in number, have not been replaced, but their vacancies have been filled with oak planks, and the interior of the cupola has been shored up with solid balks of timber, to render the shield as irresistible a target as 4½-inch slabs of wrought iron over a breastwork of oak can possibly supply. In the forthcoming experiments the shield is not intended to revolve, but will be fired at on one side only.

A DAILY direct train service commenced, on the 6th of May, between Berlin and St. Petersburg. A through train is also about to be established daily between Paris and St. Petersburg!

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RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list on another page :--

Fence.--This invention consists in arranging the uprights on the ends of the panels of a fence in such relation to the longitudinal rails that they project beyond the ends of those rails which are secured to them, and that they catch over the ends of the rails of the adjoining panel, leaving an open space between the adjoining ends of longitudinal rails, whereby the fence is enabled to adjust itself to uneven ground; it consists further in the employment of gibs and keys passing through mortises in the uprights and between the ends of the longitudinal rails in such a manner that the panels are firmly secured, and, at the same time, they are not prevented to follow the inequalities of the ground; it consists further in the arrangement of notches in the upper ends of the braces to catch into notches in the lower edges of the upper rails, together with notches in the edges of said braces catching over the upper edge of the second rail from the top, so that said braces are firmly retained without the use of nails, and that they steady the fence in the most perfect manner. Invented by William Gibson, of Fort Wayne, Ind.

Percussion Projectiles.--This invention, by C. W. Isbell, of New York city, relates to explosive projectiles of elongated form, to be exploded by the act of striking. Its principal object is so to apply a percussion apparatus in such a projectile as to enable it to be made solid at the point or end which strikes, and another object is to enable the projectile to be transported ready primed without danger. It consists in the attachment of the hammer of the percussion apparatus to the rear portion or breech of the projectile by a device which holds it back until the discharge of the projectile from the gun: also in so constructing and applying the said device for attaching the hammer to the rear portion or breech of the shell that it may be caused to liberate the hammer by the driv-forward of the rear portion of the projectile relatively to the front portion thereof, by the act of discharging the projectile from the gum, the hammer, when so liberated, being held back by inertia, until the projectile strikes, when the momentum carries it forward and causes it to explode the percussion priming.

Paper-Folding Machine.--The object of this invention, patented to Lewis E. Osborn, of New Haven, Conn., is to obtain a machine which will be capable of being applied directly to a printing press, and operated automatically therefrom, receive the printed sheets from the press and discherge them in a folded state, the sheets being folded one or more times--that is to say, in folio, quarto, octavo form, &c., as may be desired. The invention is more especially designed for folding newspapers for mailing, but may be advantageously used for folding other printed sheets. The invention consists in the employment or use of one or more pairs of rollers provided with fingers or nippers and conveying tapes, in connection with adjustable holding tapes, one or more feeders fitted in the fly, and in a feeding frame. All arranged so as to effect the desired end.

Mode of Making Baskets.--The object of this invention is to facilitate the construction of baskets so that the same may be constructed not only in a more expeditious manner than hitherto, but also of any desired dimensions, so that they may be made accurately to a gage, and serve as measures of capacity. To this end, the invention consists in the employment or use of a block or former provided with guides, cords and gage measures or marks, over which the basket is formed or made. Invented by J. D. and J. T. Shuler, of Lockport, N. Y.

Spinning Frames.--This invention relates to the use of front drawing rolls having an intermitting action for the purpose of allowing the twist to run back from the spindles to the delivery rolls, and it consists in an apparatus for preventing the strain arising from the draft of the bobbin or spindle from acting injuriously on the twisted yarn above the said drawing rolls, such apparatus consisting principally of two surfaces, between which the yarn passes, and one of which moves toward and from the other, to seize the roving or yarn before each intermission in the action of the drawing rolls takes place, and liberate it immediately after the resumption of the action of the rolls. Patented to John H. Bloodgood, of New York city.

Wad for Ordnance.--Elijah D. Williams, of Philadelphia, Pa., is the inventor of a wad composed of two or more concavo-convex disks of metal, each having a series of radial or nearly radial openings so arranged with respect to similar openings in the other or others that the metal of one covers the openings in the other, such wad being constructed of such diameter relatively to that of the bore of the gun in which it is to be used that it will pass easily through the bore in loading, but that the explosive force employed in ramming the charge home, or both of these forces will act upon it to change its concavo-convex form to a plane or a form approximating nearer to a plane, by which it will be spread laterally, and caused to fill and close the bore between the powder and the projectile, in such a manner as to prevent all escape of gases and obtain the application of the entire explosive force of the powder to the projection of the projectile, and in such a manner that in rifled arms it will be caused to receive and impart to the projectile a rotary motion.

Ships.--This invention consists in compensating for the loss of buoyancy at the bilge of a vessel, consequent upon its rotundity, by commencing the bilge lower down the sides, and extending it below the usual base line to any point not below the bottom of the keel, but below a horizontal line with the top of the keel, the principal object being to prevent rolling. The U. S. steam gunboat *Pawnee* is built according to this patent, which was obtained by John W. Griffiths, of Philadelphia, Pa.

Spinning Frame.--This invention relates to the combination of drawing and twisting mechanism to produce draft and twist simultaneously in the same portion of the roping or yarn. It consists in a certain novel system of drawing mechanism applied directly to the spindle of a spinning frame, whereby the simultaneous draft and twist are obtained with a more simple construction of the machinery than heretofore. W. T. Abell, of Vernon, Iowa, inventor.

Wisconsin Inventions---Improvements in Railroad Brakes.

We copy the following article from the *Daily Wisconsin*, published at Milwaukie. The inventions described have been secured by patent through the Scientific American Patent Agency, and we expect soon to illustrate them in our columns :--

We had the pleasure of witnessing, on the evening of the 7th, at his room in the Newhall House, some of the inventions of Mr. A. I. Ambler, of this city, in connection with railroad braking, which promise great benefits to railroad interests, and great pecuniary advantage to the inventor and those connected with him in the enterprise.

These inventions, which are patented in the United States and in the principal countries in Europe, consists of a brake, a coupler, an improved shoe and an indicator, all for railroad cars.

We cannot, in this article, give a description of these inventions, or set forth all their merits. We will simply state that they dispense with all brakemen on passenger, freight and mixed trains, and place the whole braking power in the hands of the engineer, to whom it properly belongs.

By the use of these inventions, the engineer can obtain the maximum of power with perfect uniformity of pressure, and continuity of action upon every wheel throughout the train, in two seconds of time, thus bringing a resistance to the momentum, so perfectly and mechanically distributed upon every car, as to secure the almost instantaneous stopping or braking of the train. This is, however, effected without any injury to the machinery or train, so perfect is the arrangement to this end. The braking can be done by hand, by momentum, or by steam, as may be desired. It may be proper also to state that the whole train can be stopped by hand from any given car in the train, and any separate car in the train can be stopped by hand, without interfering with the means by which the continuous braking is effected.

These inventions accomplish three things never before attained in car braking--continuity of braking by one man, simultaneous action and perfect uniformity of pressure on all the wheels in the train.

Mr. Ambler has some nine different combinations, all based upon the same general principle, for operating the brakes, seven of which are completely shown up by models of 35 inches in length, and coupled together in a train, each model showing a different method of operating the brakes.

From the fact that these brakes dispense with all brakemen, prevent the wheels of cars from sliding on the track, bring the whole face of the shoe upon the wheels and prevent unequal wearing, increase the frictional surface of the shoe upon the wheel by a new and simple device, and enable the engineer to put all the braking power of the train upon the wheels, in the same time that would be required to signal the brakeman in the ordinary method of braking, we are convinced that they will be an immense saving to railroad companies, and afford great additional security to life and property. When railroad managers shall have examined these inventions, and made themselves acquainted with their simplicity, economy and efficiency, they cannot do without them, but must bring them into general use.

Their leading characteristics are, continuity, simultaneousness and equality, as well as efficiency, economy and safety.

Mr. Warrick Martin, well known in Milwaukie as the successful prosecutor in the large case of Martin against Brooks, in the District Court of the United States, owns one-third of all of these inventions; and has the financial and business control and management of the whole. The parties contemplate putting these inventions on a train of cars in Chicago soon, when those interested in railroads and the public will be invited to witness their operation.

THE LOCOMOTIVES IN INDIA.--The London *Engineer* says :--The opening of the railway from Umritsir to Lahore, at the beginning of last month, seems to have excited interest among the Punjabees even more intense than that felt by the Bengalees in 1854. Day after day thousands congregate, from the most distant places, to see the *Lawrence* locomotive come into Umritsir. Its fame has spread to the Peshawur and Mooltan frontiers. Some daring spirits insist on a ride on the "fire horse," just as the Bengalees used to crowd round to examine the new "car of India," and would not be convinced of the danger they incurred till a cow was killed straying on the line. A Brahmin, looking on the locomotive at Umritsir, remarked, "All the incarnations of all the gods in India never produced such a thing as that." By this time the news has been carried by the trading caravans into Cabul and Central Asia, and so our prestige increases.

The Greatest Field for Inventors.

MESSRS. EDITORS :--The people everywhere, and especially those of the cities and villages, are asking for cheap light; and the inventor of any improvement for the burning of the coal oils, that are now so cheap--an improvement that would take the place of gas for parlors and halls--and also a lamp for movable purposes--some contrivance that would be at once cheap, convenient, simple and easily kept in order--would be entitled to the thanks of all the world, and would reap to himself a golden harvest. No richer field was ever offered to inventive genius. Something is wanted that, by its completeness and adaptability, will at once compete with the gas monopolies. X.

ELECTRO-PLATING IRON WIRE.--To prevent iron wire from rusting, it is proposed to coat it with copper at one continuous operation, by running it off one reel and taking it upon another, drawing it through, at the same time a depositing trough containing a solution of the sulphate of copper. The wire is first scoured bright and then passed over a grooved metal roller in the trough connected with the pole of a battery, where it is drawn slowly through the bath upon a wooden roller, and is thus electro-plated.

A LETTER from Trieste states that the iron-cased frigate *Salamander* was launched there recently, and was to be immediately fitted out. She is the first vessel of the kind in the Austrian navy. Two floating batteries, the *Peiko* and *Palestro*, will be launched at Rochefort this month, and experiments are about to be made of a formidable cylindro-conical projectile, of which much has been said.

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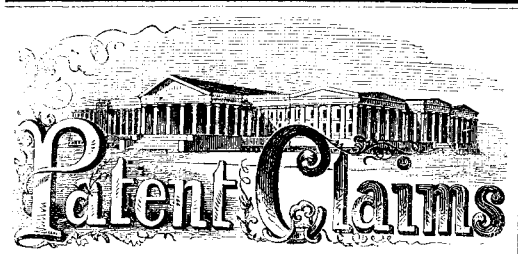

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MAY 13, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,205.—W. T. Abell, of Vernon, Iowa, for Improvement in Machinery for Spinning Wool :

I claim, first, The arrangement within the spindle, D, of a spinning frame, of a spool, b, applied relatively to and operating in combination with a pair of rolls, G G′, substantially as and for the purpose specified.

Second, Giving motion to the so-applied spool, b, by means of a drum, a, arranged within the spindle, a gear, e, upon the said drum, and a gear, g, rotating loosely upon the spindle, substantially as specified.

Third, The employment, in combination with the spindle containing the so-applied spool, b, of a vibrating guide, L v, and a vertically-moving guide rail, C, applied and operating together substantially as and for the purpose set forth.

35,206.—H. K. Averill, of Decorah, Iowa, for a Photographic Plate Holder :

I claim the plate holder composed of a solid frame provided with points, b b, and edges, a a, substantially as and for the purpose specified.

[This invention consists in so constructing the plate holder, for supporting the sensitized glass, or other plate, in the camera, as to present a series of fine points or edges for the support of the plate, the object being to prevent the collection of the sensitizing solution on the plate at the lower edge thereof, and to protect the plate or picture from stains by contact with the drippings from the plate, or other foreign matter that might be present on the plate holder.]

35,207.—H. A. Barnes, of Milwaukie, Wis., for Improvement in Shackles for Railroad Cars :

I claim the employment of a handle, e, with a common shackle, c, in combination with the drawheads, a, substantially in the manner and for the purpose as described.

35,208.—J. J. Barrett, of Georgetown, D. C., for Improved Refrigerator :

I claim the arrangement of the movable crib, C, and its case, C′, in combination with the dripping plate, E, and receiving box, F, substantially as described.

35,209.—J. C. Birdsell, of West Henrietta, N. Y., for Improvement in Thrashing Clover and Hulling and Cleaning the Seed :

In combination with the hulling cylinder, I claim the vibrating or traversing table, L, under the bolts or screens, for conveying the bolls, seed and chaff separated from the straw to the hulling cylinder, substantially as described.

I claim the spout or trough, T, between the screens and tailing trough, for the purpose specified.

I claim the spiral conveyor, W′, in combination with the hulling cylinder, for distributing the tailings from the elevator, uniformly to the feed rollers and hulling cylinder.

I claim hanging the bolts or screens, H′ H″, on swinging arms and springs, when the bars or arms, I I, are hung in the center so as to move the screens in opposite directions by the same crank and link.

In combination with the hulling cylinder, I claim the feeding rollers, P P, for the purpose specified, substantially as described.

I claim one or more rakes, N′, in combination with the comb or combs on the bolt or screen, for the purpose specified.

35,210.—Martin Bishop, of Washington, D. C., for Improved Combination of Fuel Box and Washing Apparatus with Settees :

I claim, as a new article of manufacture, a combined settee, fuel repository and washstand, constructed and arranged as drawn and described.

35,211.—J. H. Bloodgood, of New York City, for Improvement in Machinery for Drawing and Spinning Wool :

I claim the employment in drawing and spinning frames, in combination with drawing rolls, having an intermitting action of an apparatus consisting of two surfaces, of which one has a movement toward and from the other, and which operate substantially like the surfaces of d and e, for the purpose specified.

35,212.—Claude Brison, of Chalons, sur Saone, France, for Improvement in Furnaces for Retorts, Stills, &c.:

I claim providing ovens, kilns or furnaces in which retorts are or may be made use of for various manufacturing or other purposes, with vertical retorts, each having a suitable lid and a movable bottom or obturator, the latter jointed to a lever for allowing to open or shut at pleasure the lower opening of the retort, substantially as described and for the purposes specified.

35,213.—S. H. Brown, of Troy, N. Y., for Improved Hydrant :

I claim, first, The valve, a, in combination with the sliding valve, D, when constructed and arranged so as to operate, substantially as described.

Second, The sliding valve, D, with its adjuncts, K E, and i, whereby it and the valve, a, may be operated without the use of stuffing boxes, substantially as described.

Third, The grooves in the face of the sliding valve, D, whereby the waste water in the discharge pipe is allowed to pass off, for the purpose and substantially as above set forth.

Fourth, The inclined planes, n and o, in combination with the double armed lever, M, as and for the purposes described.

35,214.—Charles Campbell, of Yellow Head, Ill., for Improved Machine for Breaking Broom Corn :

I claim, first, The revolving beaters, H, and stationary bars or break iron, I, placed on a mounted frame, A, and arranged to operate as and for the purpose shown and described.

Second, The combination of the revolving beaters, H, bars or break iron, I, and guard or shield, K, all arranged or placed on a mounted frame, A, for joint operation as and for the purpose set forth.

[This invention relates to a new and improved machine for breaking broom corn preparatory to the harvesting thereof, and and is designed to supersede the manual operation of bending the stalks or stems of the standing broom corn, to facilitate its drying.]

35,215.—W. J. Cantelo, of Philadelphia, Pa., for Improvement in the Application of the Hibiscus Moscheutos to the Manufacture of Paper and Other Purposes :

I claim the application of the fibers of the American plant known as the "Hibiscus Moscheutos," or "Hibiscus Palustris," to the manufacture of paper, cordage, textile fabrics, &c., as set forth.

35,216.—John Carton, of Utica, N. Y., for Improvement in Heaters :

I claim the fire pot, composed of the sections, B and C, constructed and operating substantially as described.

35,217.—C. C. Coleman, of Worcester, Mass., for Improvement in Breech-Loading Firearms :

I claim the breech, C, swinging on a pin, b, at the bottom of its front end, and having attached to the bottom of its rear end by a pin, c, a trigger guard lever, D, constructed with a bolt, d, to lock into the frame, A, and secure the breech in a closed condition, the whole operating substantially as specified.

[This invention consists in a novel, very simple and effective mode of applying, operating and securing a movable breech.]

35,218.—Cicero Comstock, of Milwaukie, Wis., for Improvement in Rotary Plows :

I claim, first, Hanging the spade or fork shafts inside of the periphery of the wheel, as set forth.

Second, Connecting the tooth or spade to the shaft forward of the shaft, as recited.

Third, The introduction of india rubber between the box or cap of the tooth, and the shaft to give elasticity and protection to the tooth and shaft, as described.

Fourth, The hinge sections of the cams for allowing of the folding up of the forks or spades.

Fifth, Hanging the spades or forks' shaft to the wheels or arms by the handles, as described.

Sixth, I claim providing that part of the cam which receives the pressure of the spade or forks' shaft with the spring or elastic bearing.

35,219.—A. B. Cooley, of Philadelphia, Pa., for Improvement in Adjustable and Reversible Propellers :

I claim the blades, H and H′, arms, G and G′, links, E and E′, the sliding ring, F, and ring, J, when the whole of the above parts are arranged on the hollow hub or casing, D, for joint action, as set forth, and when the said ring, J, is operated by the links, M and M′, and lever, N, or their equivalents, as specified.

35,220.—John Danner, of Canton, Ohio, for Improved Washing Machine :

I claim the combination of the inner oblong-hinged rubber, M, with the slatted revolving cylinder, substantially as set forth.

35,221.—J. T. Davy, of Troy, N. Y., for Improvement in Stoves :

I claim, first, The particular arrangement of the deflecting plate, I, in combination with the coal pot, A, reverting chamber, F, and radiating flue, C, in communication with the draft pipe, D, as and for the purposes shown and specified.

Second, The arrangement of the movable perforated plate, O, across the gas passage, k, between the coal pot, A, and reverting chamber, F, in combination with the lateral gas passage, j, below the chamber, F, and the radiating flue, c, communicating with the exit pipe, D, as and for the purpose described.

Third, The arrangement of the series of small apertures, t, or their equivalent, in the outer side of the chamber, P, communicating with the open air and forming the top or rim of the coal pot, A, in combination with the expansion chamber, F, lateral gas passage, j, and radiating flue, C, communicating with the draft pipe of the stove, as and for the purpose set forth.

35,222.—L. P. Dodge, of Newburgh, N. Y., for Improvement in Pumps :

I claim, first, The arrangement of the valves, M N, in the valve chambers, K L, in the base of the air vessel, H, and arranging the seats, f g, near the joint between the parts, so that there is but a single joint of small area connecting the passages, F G, with the air chamber, all as set forth and for the purpose specified.

Second, In combination with the foregoing, arranging the joint connecting the air chamber and the cylinder casting in the same plane, so that both may be finished at one operation, as set forth.

35,223.—J. K. Dugdale, of Richmond, Ind., for Improvement in Cultivators :

I claim the arrangement and combination of the adjusting apparatus composed of the perforated plate, G, pin and spring, I, rod, F, with pinion, E, working in rack, e, substantially as described and for the purposes set forth.

I also claim the combination of the device, or guides, D′, with the frames, B and C, as and for the purpose set forth.

35,224.—A. S. Fisher, of Millville, N. Y., for Improvement in Weather Strips :

I claim the arrangement of the horizontal spring, f, and the arms, h i, with the bar, E, strip, F, and jambs, B B′, as and for the purpose shown and described.

[This invention consists in an arrangement by which the shutting of the door is made to impart endwise movement to a spring bar, which, in turn, presses an india-rubber strip down hard upon the door sill, and effectually closes the space between it and the door; the whole contrivance being arranged within the thickness of the door.]

35,225.—Paul Flechet, of Paris, France, for Improvement in Sun Dials :

I claim the improvements in solar time keepers or chronometers, substantially as described.

35,226.—H. A. Fowler, of Afton, N. Y., for Improvement in Instrument for Drafting Ladies' Dresses :

I claim, first, Connecting the chest rule, f, shoulder rule, d, arm rule, c, neck rule, a, and shoulder piece, b, for drafting the front, as described.

Second, The adjustable dart attached to the chest rule, f, by the slide, g.

Third, Connecting the form, j, with the chest rule, k, arm rule, l, and shoulder rule, m, substantially in the manner set forth and described.

35,227.—J. S. Fowler, of Peoria, Ill., for Improvement in Corn Shellers :

I claim, first, The toothed cylinder, C, in combination with the jointed and yielding slotted or grated concave, E, screen or screens, G, with a shake motion given it as described, and the endless discharging apron, K, all arranged for joint operation as and for the purpose set forth.

Second, The combination of the screws or spiral conveyers, T. Y, with the cylinder, C, concave, E, screen or screens, G, fan, N, and and discharging apron, K, and feeding apron, A′, all arranged as and for the purpose set forth.

[This invention relates to a new and improved machine for shelling corn and separating the corn from the cobs, and consists in the employment or use of an elastic or yielding concave screen, in connection with a rotary shelling cylinder, a discharging apron and a shoe provided with a screen or screens, and also in connection with spiral or screw conveyers.]

35,228.—Edward Frost, of Georgetown, D. C., for Improvement in Car Trucks :

I claim, first, The constructing the axle boxes within the jaws of the slide pedestals, C, or any arrangement of the axle ends, equivalent thereto, so as to permit a limited play, transverse of the axle, to the axle ends, in combination with the use of fixed wheels of conical tread, D.

Second, The arrangement of placing the pedestals, E E, and journal boxes, F F, at the centers of the axles, for the purpose of propelling the rolling parts by traction applied at or near their centers of gravity.

35,229.—J. C. and A. P. Garretson, of Jackson, Iowa, for Improvement in Looms :

We claim, first, The oblong box, combined with its movable bottom, to hold the shedders, and in which they operate, constructed substantially as described for the purposes set forth.

Second, We also claim the shedders, attached to their harness frames, combined with the shedding bar, to produce a shed in the web, the same being constructed and operating substantially as described and set forth.

Third, We also claim combining the sliding frame with the rack and dog to vary the shed in the web, operating substantially as described and set forth.

35,230—William Gibson, of Fort Wayne, Ind., for Improvement in Fences :

I claim, first, The space, a, formed between the ends of the rails, B B′, and between the uprights, A A′, in the manner and for the purpose shown and described.

Second, The employment of gibs, b, and keys, c, in combination with the uprights, A A′ A″ A‴, and passing through the spaces, a, between the ends of the longitudinal rails, as and for the purpose set forth.

Third, The arrangement of the notches, e and g, in the braces, D, in combination with the notches, f, in the lower edges of the upper rails, and with the upper edges of the lower rails, all constructed and operating as and for the purpose specified.

35,231.—Charles Goodyear, Jr., of New York City, for Improvement in the Manufacture of Casters from Vulcanizable Compounds :

I claim, first, The manufacture of wheels or rollers of a fibrous compound of vulcanized india rubber, or other vulcanizable material, substantially described.

Second, The manufacture of wheels or rollers of vulcanized india rubber, or other vulcanizable material, by forming and vulcanizing the same in molds, substantially as described.

35,232.—J. W. Griffiths, of Philadelphia, Pa., for Improvement in Navigable Vessels :

The construction of navigable vessels with a drop or downward extension of the bilge below a straight base line, at the mid-ship cross sections, substantially as shown and described, so as to compensate for the loss of buoyancy consequent upon the rotundity of the bilge, all as set forth.

35,233.—Benjamin Harnish (Miller), of Pequea, Pa., for Improvement in Water Wheels :

I claim the composite casing, F G H, with its open cylinder, E, in combination with and closely adapted to the buckets, N, with their outer flange or square terminus, M, and parabolic, spiral chutes, O, and the position and attachment of the check plates, P, between them, all combined and arranged substantially in the manner and for the purpose specified.

35,234.—D. M. Harris and S. S. Burnet, of Salem, Mass., for Improved Clothes Wringer :

We claim the combination and arrangement in a clothes wringer of the strap, e, attached to the ends of the shaft of roll, c′, working in the slotted boxes o′ o′, the rod, h, the thumb nut, i, rubber spring, j, and clutch, g, operating together in the manner described for the purpose specified.

35,235.—Simon Heiter, of Philadelphia, Pa., for Improvement in Tents :

I claim a tent having expanding and contracting ribs, like an umbrella frame, to which are permanently attached the canvas top and sides, the whole being constructed and operating substantially in the manner set forth.

35,236.—William Hopper, of Onion Grove, Iowa, for Improvement in Wind Wheels :

I claim the arrangement of the longitudinally-sliding rotary rod, G, and rotary ropes, p, connecting with the sails, F, in the manner described, in combination with the crosshead, H, pivoted stirrup, J, ropes or chains, c′, and windboard, K, all constructed and operating substantially as and for the purpose set forth.

[This invention consists in the arrangement of a longitudinally-sliding rotary rod, connecting with a crosshead, to which motion is imparted, either by hand or by the action of a wind board, and by an endless chain, in combination with ropes or lines leading from the outer end of said sliding rod to the sails, in such a manner that by imparting to the rod a longitudinally-sliding motion the sails are either drawn in or drawn out, as the case may be, and that by combining the wind board with said rod the speed of the wind wheel is regulated by the force of the wind.]

35,237.—S. B. Hunt, of New York City, for Improved Automatic Boiler Feeder :

I claim automatically supplying a steam boiler with a regular proper supply of feedwater, by the combination of the tank, B, sham pipe, D, and feed pipe, F, arranged and operating as set forth.

35,238.—Alfred Ingalls, of Independence, Iowa, for Improved Evaporator for Saccharine Juices :

I claim, first, The arrangement of three pans, A B C, placed at different levels on the furnace, D, in combination with the dampers, F G H, and fire doors, d e, constructed and operating as and for the purpose shown and described.

Second, The arrangement of the skimming device, I, in combination with seats, m n m′ n′, on the edges of the pans, A B C, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the arrangement of three pans, placed at different levels on the same furnace, in combination with three dampers and two fire doors, in such a manner that the heat under each of the pans can be regulated at pleasure, and that each pan can be emptied whenever it is desired, without interrupting the operation of the others. It consists, also, in the arrangement of a movable skimming device, fitting on the edges of the first two pans, in combination with seats or recesses cut into said edges, in such a manner that the scum, as it rises on the surface of the juice, can be swept off in an easy and expeditious manner.]

35,239.—T. T. Jacobs, of Mount Carroll, Ill., for Improved Mode of Securing Chimneys to Lamps :

I claim the combination of the two clasps, A A, each having two projecting lips or catches, c c, with the spring, D, constructed, operated and applied, substantially as and for the purpose specified.

35,240.—David Keyser, of Philadelphia, Pa., for Improved Boot-Blacking Stand :

I claim, as a new manufacture, the box, A, drawer, D, lid, B, and block, E, when combined and arranged as set forth, for the purpose specified.

35,241.—William Johnston, of Cincinnati, Ohio, for Improvement in Breech-loading Firearm :

I claim, first, The axle, C, constructed of a conical or tapering form, when used, in the manner and for the purpose described.

Second, The causing of the cock, G, to recoil at each discharge, by the use of a spring, i, and a stop, c, or their equivalents, substantially in the manner and for the purpose described.

Third, In breech-loading guns, so arranged as to be loaded by the insertion of a cartridge from the rear, I claim the construction of the chamber, which is to receive the cartridge, in the form of the frustum of a cone, having the base of the cone at the lower rear end of the chamber, when that chamber is so arranged that access may be readily had thereto, for the purpose of removing with the thumb and finger the shell of a metallic cartridge after each discharge, substantially in the manner and for the purpose specified.

35,242.—Isaac Knapp, of Medina, N. Y., for Improvement in Stop Dams for Canals :

I claim the structure described, and the mode or manner of using the same, as explained.

35,243.—Henry Knight, of Jersey City, N. J., for Improvement in Molds for Cement Pipes :

I claim the combination of the divided core, D D′, slots, i i, guide pins, h h, and perforated platform, B, substantially in the manner described.

Second, The construction of the base plate, E E′, in such a manner that it constitutes when in use the collar of the core bar and also the bottom of the mold, and serves as a support to the outer or lower end of the pipe, and also the shoulder of the socket when the mold and pipe are being lifted over the core, substantially as described.

Third, The construction of a vertical mold, divided longitudinally in two parts, in combination with the base plate, so arranged that it shall support and hold the two parts of the mold firmly closed, while the said mold and the inclosed pipe are being raised over the core bar, substantially as described.

35,244.—Alexander M'Nair, of Newark, N. J., for Improvement in Running Gear of Cars for Street Railways :

I claim the combination with the axle, H, and floor frame, C, of the projected-pivoted truck, I, flanged wheels, K K, axle, L, standard, e, and adjusting screw rod, C, in the manner and for the purpose shown and described.

[The object of this invention is to obtain a street railway car to run off the track when it becomes desirable to do so, in case of any obstruction, or under other circumstances. In carrying out the invention the track is constructed with two flat-surfaced grooved rails, and the main wheels of the car constructed without flanges, and the front pan of the said wheels arranged in a truck attached to the car by a king bolt. The invention consists in so attaching to the same truck a pair of guide wheels, having central flanges to fit the grooves of the track, that they can be raised up from the track independently of the truck, by means of a screw, or its equivalent, under the control of the driver.]

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35,245.—B. Mellinger, S. Mellinger, Jr., and J. Mellinger, of Mount Pleasant, Pa., for Improvement in Horse Rakes:

We claim attaching the thills, C' C', to the axle and rake head, A, by joints, c c, at the back part of the axle and rake head, in combination with the whiffletree, I, attached to a segment clevis, L, on the axle and rake head, A, by means of a stay rod, K, and rod, J, all arranged and operating as and for the purpose specified.

[The object of this invention is to obtain a horse rake, in which the weight of the driver in his seat, in connection with the pull or draught movement of the horse, is made to pull the rake in a proper working position, and also made to assist in elevating the same when the rake has its load discharged from it, the weight of the driver or operator keeping the rake in an elevated state.]

35,246.—Suspended.

35,247.—Richard Montgomery, of New York City, for Improvement in Apparatus for Using Submarine Guns:

I claim a cylinder or tube-extensible telescopically or by analogous means, to be kept free from water by means of a ring or analogous device, as conducting pipe for the transmission of shot or shell under water.

35,248.—William Murdock, of Jersey City, N. J., for Improvement in Molds for Castings:

First, I claim the screw, C', in combination with the movable section nor half mold, C, and the pins and holes, G, as and for the purpose specifie

Second, I claim the arrangement of the elevated or raised edges, e, around the form of casting, b, and gate, a, upon the metallic molds, as and for the purpose set forth.

35,249.—L. E. Osborn, of New Haven, Conn., for Machine for Folding Paper:

I claim the employment or use of a fly, B, provided with a bar or feeder, H, operated automatically through the medium of the frame, G, and fly, B, in combination with the rollers, J J', feeding frame, A', and rollers, Y Y, all arranged for joint operation, as and for the purpose set forth.

Second, The automatically-adjustable tapes, n n, when used in connection with the sheet-conveying tapes, m, and operated substantially as and for the purpose set forth.

Third, Operating the fingers, Q Q, of the rollers, J J', through the medium of the springs, q, on the shafts, R R, the projections, r, on said shafts, the catches, t, on the levers, T, and the lever, W, actuated as shown, to operate on levers, T; and these parts I claim, applied to all the fingers of any number of pairs of folding rollers that may be employed in the machine.

35,250.—W. K. Osborn, of Chester, N. J., for Improvement in Straw Carriers and Grain Separators:

I claim the separate rake heads, L, when provided with straight and curved teeth, as described, and when combined with crank shafts, so arranged as to impart to them an alternate up-and-down motion, substantially as and for the purpose specified.

I also claim, in combination with the above, the shaker, D, when arranged for joint action with the rakes, in the manner substantially as set forth.

I also claim the curved teeth, f', when made adjustable, in the manner and for the purpose described.

35,251.—Alphonse Oudry, of Paris, France, for Improvement in Bridges:

I claim, first, The employment of double parabolic cables or chains, as described and shown.

Second, The employment of two series of rods set obliquely to the plane of the platform, substantially as described and shown.

Third, The employment of rigid tie pieces to overcome the effect of a horizontal force acting laterally upon the four double chains or systems of suspension which would otherwise tend to deform, distort or alter therefrom, together with the means described to replace such tie pieces in the middle of a bridge or viaduct, so as not to impede the circulation, all as described and illustrated.

35,252.—Aaron Palmer, of Brockport, N. Y., for Improvement in Sewing Machines:

I claim the combination of the crimping wheels, L and M, with the adjustable needle holder, z, and transverse shaft, U, substantially as described, and for the purposes set forth.

35,253.—Almarin B. Paul, of Silver City, Nevada Territory, for Improved Amalgamator and Ore Mill:

I claim a rotating muller for amalgamating pans, formed of a series of curved flat arms, B B B B', provided with slots, a, and having curved grooves, a*, in their under surfaces or face sides; said arms being attached to an annular hub, A, which also has radial arms, C, connected to it provided with pins, f f', and adjustable upright copper plates, D, substantially as described.

[The object of this invention is to obtain a simple and efficient device for pulverizing the pulp of gold and silver bearing quartz, and separating and amalgamating the gold or silver contained therein. The invention has a rotary motion, and is designed to be used in connection with an ordinary amalgamating pan or vessel into which the pulp flows or is placed, the invention operating as a pulverizer or muller, and also as an amalgamator, and performing the work in a very thorough and expeditious manner.]

35,254.—Samuel Peberdy, of Philadelphia, Pa., for Improvement in Knitting-Machine Needles:

I claim combining with a barbed knitting needle the shield or guard, h, constructed in the manner described, or any equivalent to the same, so as to guide and retain the thread, in the manner specified.

35,255.—N. C. Perry, of Chester, Conn., for Improvement in Machine for Binding Wire:

I claim, first, The use of the eccentric post, H, in the manner and for the purpose set forth and described.

Second, I claim the guide, I, and the clamp, B, in combination with the eccentric post, H, operated in the manner set forth and described.

35,256.—John Pfaff, of Philadelphia, Pa., for Improvement in Tail Pieces for Violins:

I claim combining the tongue, y, with the tail piece of a violin, substantially as and for the purpose set forth.

35,257.—C. B. Porter, of Ann Arbor, Mich., for Improvement in Apparatus for Inhaling Chloroform:

I claim the combination and arrangement of the reservoir, air chamber, air regulator, screen, valve, tube and mouthpiece, substantially as described and for the purpose specified.

35,258.—A. M. Putnam, of Antrim, N. H., for Improvement in Pumps:

I claim the described pump, consisting of the piston, E, cylinders, A and G, chambers, H I J K, with ports, g and h, in combination with the base, C, containing water ways, i n q, with open ports, r o, and and valves, l m s p, arranged and operating substantially as described.

35,259.—Andrew Rawlston, of West Middletown, Pa., for Improvement in Combined Rack and Trough for Feeding Stock:

I claim, first, So combining a rack and trough that the superincumbent pressure of the rack shall hold coarse fodder in place in the trough, in the manner and for the purpose substantially as set forth.

Second, I claim a removable protector, L, adapted to be used upon the rack and trough, or separate therefrom, in the manner and for the purpose substantially as set forth.

Third, I claim, in combination with the rack, H, having partitions, h h', the removable weather protector, L, substantially in the manner and for the purpose set forth.

35,260.—Elisha Rees, of Manassas Station, Va., for Improved Blacksmith's Tongs:

I claim the employment of the handles, A B, the jaws, C D, the bar, E, screw, F, and standard, G, arranged and used together in the manner and for the purpose set forth and described.

35,261.—S. G. Reynolds, of Bristol, R. I., for Improvement in Power-Spading Machines:

claim the combination of the series of cranks, m, set in a curved or spiral line, and the shackle bars, t, or their equivalents, with the spade, carriers, O, for the purpose of giving the required motion to the spades, as shown, to enter the ground, pulverize the soil and clear themselves, as described.

Second, I claim the yielding spade carriers, operating as set forth, for the purpose specified.

Third, I claim, in combination with a power-spading machine, the pivot, K2, placed within the axis of the bearing wheels and operating as set forth.

Fourth, I claim the combination of a mechanical-spading machine, with a harrow, when the harrow follows the machine, and is operated by cranks, in the manner substantially as set forth and for the purpose specified.

35,262.—J. A. Rhodes, of Providence, R. I., for Improvement in Yarns for Warps:

I claim the use of steam impinging yarns, cloths and other fibrous matter, while immersed in size, paste or other fluid, with which said yarn, cloth, &c., is to be sized or dressed, substantially as described, for the purpose specified.

I also claim the use of steam, impinging the surface of the roller, g, or other device used for immersing or applying the size, paste or other fluid with which the yarn, cloth or other fibrous matter is to be sized or dressed, substantially as described, for the purpose specified.

35,263.—E. S. Ritchie, of Brookline, Mass., for Improvement in Mowing Machines:

I claim the arrangement of a revolving knife, consisting of an endless band of spring steel, its driving pulley, a series of teeth, and a continuous or endless carrier or frame, substantially in manner and so as to operate as specified.

I also claim the arrangement of the grinding wheel, relatively to the endless band knife.

I also claim arranging the band-knife carrier and driving pulley, relatively to the axle and the wheels thereof, and applying the carrier to the axle by means of arms or equivalent devices, so that the carrier may be tilted or moved relatively to the wheels and axle, as specified.

I also claim the combination of the clutch and its operative mechanism, substantially as described, with the driving wheel, the train of gears and the knife carrier, arranged and applied together, as set forth.

35,264.—William Seybold, of M'Keesport, Pa., for Improvement in Miners' Lamps:

I claim constructing lamps for burning tallow or other non-fluid fatty substances, with a wick tube of copper or other sufficient conductor of heat, surrounded by a hot-air chamber, for the purpose of melting the tallow or fat around the wick in the lamp, and keeping the tallow melted in the wick itself, substantially in the manner and for the purposes set forth.

35,265.—J. D. Shuler and J. T. Shuler, of Lockport, N. Y., for Improved Means for Manufacturing Baskets:

I claim, first, Constructing baskets over a block or former, in the manner and substantially as shown and described.

Second, The particular arrangement of the guides, B, cord or band, C, and grooves or gage marks, a a', combined or used in connection with the former, as and for the purpose specified.

35,266.—Emerson Smith, of New Haven Mills, Vt., for Improvement in Shingle Machines:

I claim the particular manner of operating or adjusting the jaws, j, to wit, by means of the pins, e, attached to arms, d, on the shafts, E, and fitted in oblique slots, f, in the upright plates, g, of the slides, h, to which the jaws, j, are secured.

[This invention relates to a shingle machine of that class in which a circular saw is employed for cutting the shingles from the bolt. The object of the invention is to obtain a machine which may be manipulated by two persons, in such a manner as to insure the work being rapidly performed and in a perfect manner, the great loss by the imperfect shingles produced by the automatic shingle machines being avoided and a much simpler device obtained.]

35,267.—O. C. Smith, of Salem, Mass., for Improvement in Piston Packing:

I claim the combination with the head, A, cap, C, and packing rings, G G, of the arc-formed expanding pieces, F F F, the cone, H, and spring, I, the whole arranged, applied and operating substantially as specified.

[This invention consists in the employment for pressing out the packing rings, of a series of arc-formed expanding pieces fitted to the interior of the rings, a hollow cone fitted to the hub of the piston and to the interior of the arc-formed expanding pieces, and a spring coiled round the hub between the cone and the cap or follower of the piston, the whole combined and operating to produce an outward pressure against the interior of the rings, for the purpose of holding them in contact with the cylinder and compensate for wear.]

35,268.—C. A. Strong, of Brooklyn, N. Y., for Improvement in Mode of Building and Coating Earth Fences:

I claim the described mode of building earth fences by means of a mold and coating them, substantially in the manner set forth.

35,269.—George Tainter, of Watertown, Mass., for Improvement in Ventilating Dampers:

I claim the combination of the conical damper, C, and band or ventilating register, B, connected together and applied to the flue or pipe for joint operation, substantially as and for the purpose specified.

[This invention consists in the employment of a hinged conical damper and ventilating register constructed and applied to the flue or pipe of a stove or furnace, in such a manner that the damper will be opened and closed or adjusted simultaneously with the adjustment of the register and a superior ventilating attachment attained.

35,270.—John Taylor, of Magnolia, Ill., for Improvement in Rakes for Harvesters:

I claim the rake frame provided with slotted arms, I I', and the cross bar, K, in combination with the crank shaft, G, and cams, L L', as and for the purposes set forth.

I also claim the rake, J, provided with slotted arms, I I', and the cross bar, K, and hinged to the arms, c c', which are attached to the rock shaft, H, in combination with the crank, G, and cams, L L', when the several parts are arranged for operation in connection with each other and with the concave platform, A, in the manner and for the purpose specified.

35,271.—J. B. Wheeler, of Boston, Mass., for Improvement in Stirring, Conveying and Cooling Grain:

I claim, first, In combination with a perforated bottom through which air is driven by a fan, a reciprocating carriage, which carries a series of conveyers and revolving stirrers that move and turn over the grain as it is being advanced over said perforated bottom, substantially as described.

I also claim, in combination with a reciprocating carriage, the conveyer, G, which has in addition to its forward and backward movement, a rising and falling movement, substantially in the manner and for the purpose set forth.

I also claim, in connection with a reciprocating carriage, a section of conveyers composed of blades, m, that are moved laterally by the cams, j and k, in the manner and for the purpose set forth.

I also claim, in connection with a reciprocating carriage, the hinged conveyer and stirrer, x, that acts while the carriage goes forward and swings up out of the grain when the carriage moves backward, for the purpose substantially as set forth.

35,272.—E. J. White, of Locke, N. Y., for Improvement in Plows:

I claim the plows, M Q, when attached to vertical sliding standards, L R, which pass loosely through the mounted frame or platform, A, and are connected to adjusting levers, K S, in combination with the vertically adjustable colters, P T, and gage wheel, X, all arranged for joint operation, as and for the purpose set forth.

[This invention relates to an improvement in gang plows. The object of the invention is to obtain a simple and efficient device which may be readily manipulated and adapted to plowing at various depths, be capable of being mounted on wheels, and all so arranged as to insure an easy draught and admit of any number of plans being used at the will of the driver or operator.]

35,273.—E. D. Williams, of Philadelphia, Pa., for Improvement in Wads for Ordnance and other Firearms:

I claim a wad composed of two or more concavo-convex disks of metal provided with slits, b b, and combined substantially as specified.

35,274.—Isaac Winslow, of Philadelphia, Pa., for Improvement in Preserving Green Corn:

I claim the described process of first removing the corn from the cob, and then preserving the kernels, substantially in the manner and for the purposes set forth.

35,275.—Robert Chadwick and Norman Allen (assignors to said Robert Chadwick), of Hartford, Conn., for Improvement in Machine for Casting Bullets:

We claim the combination of a rotating mold frame, E F, a series of molds, G G, a system of levers, H H, and a cam or cams, the whole applied and arranged to operate substantially as specified.

35,276.—A. L. Fleury, of Philadelphia, and Charles Adams, of Pittsburgh, Pa., assignors to W. J. Cheyney, of Philadelphia, Pa., for Improvement in the Manufacture of Iron and Steel:

We claim, first, Directing a jet of steam into or toward a pipe or passage which forms a communication between the chimney or stack of a puddling furnace, cupola, blast or other furnace, and the fire place or body of ignited fuel within the said furnace, so that said steam may be mixed with a portion of the products of combustion, and the whole propelled along the said passage toward the furnace, for the purpose specified.

Second, Introducing through the hollow bridge of a puddling furnace, hydro-carbon alone, or hydro-carbon mixed with nitrogenous substances, or deoxidizing vapor, for the purpose specified.

35,277.—C. W. Isbell, of New York City, assignor to himself and E. S. Ely, of Providence, R. I., for Improvement in Explosive Projectiles:

I claim, first, The attachment of the hammer of the percussion apparatus to the rear portion or breech of the projectile, substantially as and for the purpose specified.

Second, So constructing and applying the device for attaching and holding back the hammer within the projectile that it is caused to liberate the hammer by the driving forward of the rear portion of the projectile relatively to the front portion thereof, by the act of discharging the projectile from the gun, substantially as specified.

35,278.—J. M. Martin (assignor to himself, Myers, Uhl & Co.), of Cleveland, Ohio, for Improvement in Construction of Monuments:

I claim the plate, H, clutches, O P, nut, T, bolt, U, springs, M N, and heads, K K', these several parts being arranged in relation to each other and operating in the manner and for the purpose set forth.

35,279.—Thomas Shaw, of Philadelphia, Pa., assignor to himself and P. S. Justice, for Improved Means of Connecting Metallic Armor Plates for Marine or other Batteries:

I claim the firmly uniting of armor plate by means of fusible metal substantially as described.

35,280.—Alonzo Streeter, of Adrian, Mich., assignor to himself, Thomas Farrar and Amzi Chase, of Wellsville, Mich., for Improvement in Corn Planters:

I claim, first, The combination and arrangement of hoppers, D, and wheels, B, as described, for the purpose described and set forth.

Second, I claim the combination of the post, K, lever, G, shaft, H, connection, J, spiral springs, 4, connection, O, shoes, Q, and cutters, R, for the purposes set forth and described.

Third, I claim the combination of the levers, 5, with the elbow levers, 2, for the purposes described.

Fourth, I claim the crank, U, windlass, T, rope, V, and sheaves, W, in combination with slide, P, and guides, S, for the purposes set forth and described.

35,281.—John Thomas, of Indianapolis, Ind., assignor to himself and J. M. Lord, of Marion Co., Ind., for Improvement in Rolls for Rolling Piles of Railroad Iron:

I claim the rolls, G and H, constructed and arranged as and for the purposes set forth.

35,282.—L. B. Waterman (assignor to himself and James S. Bangs), of Chicago, Ill., for Improvement in Cultivators:

I claim the arrangement of the adjustable sea, D, in combination with the doubletree, G, draft rods, K K, and graduating bar, I, when operated and attached to the frame work for the uses and purposes described, as substantially set forth.

35,283.—S. R. Wing, of Sandwich, Mass., assignor to L. M. Wing, of West Falmouth, Mass., for Improved Rollers for Wringing Machines:

I claim one or more rollers made of or covered with cork, for the purpose specified, substantially as described.

I also claim the self-adjusting traversing guides for pressing in the edges of the cloth or clothes as they pass in between the rollers, as described.

35,284.—W. H. Elliott, of Plattsburgh, N. Y., for Improvement in Breech-loading Firearms:

I claim so constructing and arranging the sliding breech and hammer, in relation to each other, that when the former is thrown back, the hammer will cease to act upon it to throw it forward, but will hold it from moving by a downward pressure, while the cartridge is being placed in the loading chamber, as set forth.

Second, The employment of a toggle joint for moving the sliding breech when that part of said joint which forms a portion of the lever, m, is pivoted to the sliding breech, and when the other part of said joint is pivoted to a fixed point upon the arm, substantially as set forth.

Third, the employment of the pin, s, in combination with a trigger, which is attached to and swings back and forth upon the guard lever, and with a side lock sere, as specified.

Fourth, The arrangement and operation of the sliding breech and clutch, by which they approach each other and catch the head of the cartridge between them before driving it into the barrel chamber, as specified.

35,285.—W. H. Elliott, of Plattsburgh, N. Y., for Improvement in Operating a Submarine Battery connected with a Boat or other Vessel:

I claim, first, the employment of a magazine which is controlled or governed by an arm attached to a vessel by means of joints, and arranged below the surface of the water, as and for the purpose specified.

Second, The employment of a float, h, in combination with an arm and magazine which are attached to the vessel by means of joints, as set forth.

Third, The employment of a rudder, t, in combination with an arm attached to a vessel by means of joints, as and for the purpose specified.

Fourth, Arranging the arm, c, with the joints which attach it to the vessel, in such relation to the bulk that the magazine upon its extremity may be dragged through the water at the side of the vessel, when moving from place to place, as shown.

Fifth, The arrangement and combination of the arm, c, joint, f, and extension, e, when employed in connection with a magazine, as set forth.

Sixth, The employment of the hollow vertical shaft, n, in combination with an arm, c, and poles, v, as and for the purpose specified,

RE-ISSUES.

1,306.—Gail Borden, Jr., of Amenia, N. Y., for Improvement in Concentrating and Preserving Sweet Milk. Patented Aug. 19, 1856:

I claim, first, Concentrating sweet milk by evaporation in vacuo, substantially in the manner and for the purpose set forth.

Second, In the process of concentrating sweet milk in vacuo, I also claim the preparatory scalding of the milk by heating it to a temperature of from 150° to 200° Fah., substantially in the manner and for the purpose described.

1,307.—Daniel Holmes, of Chelsea, Mass., assignee of Joseph Harris, Jr., and Daniel Holmes, of Roxbury, Mass., for Improved Carpet Beating Machine. Patented Feb. 23, 1858:

I claim, first, The use of the revolving endless flexible beaters, a a g g, or their equivalents, when used and operated substantially as described for the purposes specified.

Second, The combination of a set of vibrating flexible whips, or their equivalents, with a set or sets of revolving endless whips, substantially as described for the purpose specified.

Third, The use of an elastic cushion, L, placed in front of the carpet to sustain the shock of the whips, substantially as set forth.

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1,308.—Lewis Horning, of Montgomery Co., Pa., assignee of J. Y. Humphrey, of Philadelphia, Pa., for Mica Chimneys for Lamps. Patented July 17, 1860:

I claim the construction and use of lamp chimneys made mainly of mica, when the upper end is contracted and made smaller than the lower or middle portions thereof, substantially in the manner and for the purpose described.

I also claim binding the mica chimney of a lamp with rings of metal, substantially in the manner and for the purpose described.

1,309.—H. D. Snow, of Rochester, N. Y., for Improvement in Governor Valves. Patented Oct. 11, 1859:

I claim constructing steam governors substantially as set forth, so as that the downward movement of the balls, when they drop below the point affording a full opening to the valve shall tend to close it.

EXTENSION.

5,585.—Edward Spain, of Philadelphia, Pa., for Improvement in Churns. Patented May 16, 1848:

I claim the giving the dasher the form represented and described, which, while it imparts a compound reciprocating and rotating motion to the cam, as it is operated upon, thereby also enables a large-sized dasher to be passed whole through a comparatively small-sized square aperture in the side of the barrel, as set forth.

DESIGNS.

1,576.—Henry A. Fowler, of Afton, N. Y., for Design for Hames Fastening.

1,577.—David Foyer, of Dover, N. H., assignor to Abraham Folsom & Son, of Boston, Mass., for Design for a Floor Cloth Pattern.

1,578 and 1,579.—F. S. Otis, of Brooklyn, N. Y., for two Designs for a Clock Case Front.

1,580.—J. R. Wennett, of New York City, for design for a Spoon.

1,581.—C. J. Woolson, of Cleveland, Ohio, for Design for a Cook Stove.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States.—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the inventio The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principa office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invite correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

C. H. S., of N. H.—The best description of the manufacture of woolen goods that we are acquainted with is that in Ure's Dictionary of Arts and Sciences. It is said that a new edition of the work is about being published.

H. O. N., of N. Y.—Parachutes are made in the form of umbrellas with a hole at the apex to prevent them from oscillating. Experienced aeronauts generally avoid the use of parachutes; accidents so frequently result from their use. The rapidity of the descent will depend on several circumstances, but principally on the size of the parachute in relation to the weight of its burden.

H. A. J., of Me.—Plaster of Paris after being calcined and ground, requires only to be wet with water in order to cause it to harden.

L. C. C., of Mass.—Our aeronauts make their balloons of cotton cloth, and generally cover them with a cement, the composition of which they keep secret. We know of nothing better than linseed oil. Hydrogen gas will make its way in time through any substance, even wrought iron plates.

E. G. S., of N. B.—Overman's work on the manufacture of iron was published by Henry C. Baird of Philadelphia in 1850. Ure's Dictionary of Arts and Sciences contains an elaborate treatise on the subject.

Q. A. S., of Pa.—For information in relation to the improvement on Mr. Parkes's plan of vulcanizing, you can address John A. Greene, 37 Milk street, Boston. Alcohol boils at a temperature of 173°, and water at 212°, so you are in greater danger of explosion with alcohol than with water at a given temperature.

T. S. C., of N. Y.—To transmit 15 horse power with a belt running 25 feet per second, your belt should be 11½ or 12 inches wide. It will take 15,000 pounds of water per minute to give 15-horse power with 11 feet fall. The very best turbines have yielded 87 per cent of the whole power of the water; this would require about 52,000 lbs. per minute for your purpose. Very few wheels, however, yield more than 70 per cent and with one of this class you would need about 64,000 lbs. per minute. A cubic foot of water weighs 62½ lbs.

R. U., of Mich.—There are a great many roofing compositions. Some patented, and some kept secret. The essential ingredients in most of them are coal tar and asphaltum.

J. W., of Ohio.—A gallon of water weighs 8 pounds, 33,000 pounds per minute gives one horse power for every foot fall, and a good overshot wheel will yield about 70 per cent of the power. Hence it will take 2,107 gallons per minute to give you 5 horse power from a 14 foot overshot wheel.

C. W. B., of Ill.—India rubber may be dissolved in spirits of turpentine or in benzole. You can form it upon a mold by dipping the mold into the solution repeatedly as candles are dipped; allowing the rubber to harden between the immersions. If you use a wooden mold rub the surface with pumice stone before using it.

H. C. F., of N. Y.—If you wish to submit plans of an iron-plated battery to the inspector of the government, address Hon. Gideon Welles, Secretary of the Navy, Washington

P. H. S., of N. J.—We have a good opinion of Well's Natural Philosophy, and for a new beginner we think it equal to any other. It is issued by Iveson & Phinney of this city.

R. N., of Pa.—Professor Gillespie's work on Surveying and Mahan's Civil Engineering are good works. You can obtain them at Appleton's in this city.

N. P. A., of N. Y.—If your model now in the Patent Office shows the invention you desire to claim you can surrender your original patent and ask for a re-issue. If what you now claim was new when you first applied for the patent you are entitled to the re-issue.

C. A. B., of Prince Edward Island.—You will find rules for making a chime of bells in almost every encyclopedia, but it requires a thoroughly practical person to tune a chime, just as it requires a practical person to tune a piano forte. It cannot be done by theory.

J. H. C., of Mass.—Canadian balsam dissolved in rectified oil of turpentine is the best clear varnish for maps, drawings, &c. The balsam should be placed in the turpentine and set aside in a moderately warm place, and agitated occasionally for about seven days. A varnish made with pale mastic dissolved in alcohol is used to fix pencil drawings.

W. G. R., of Del.—Every patented article must bear the date of the issue. You were not obliged to put the date on the articles you have sold and delivered previous to the issue, but all that are subsequently sold should have a label attached stating the date of the patent. Or in your case it would be better to stamp it into the wood.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000; Belgium, 5,000,000, Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, May 21 1862:—

S. B. E., of Conn., $15; B. and R., of Ill., $25; J. C. M., of Ill., $25; J. G. W., of N. Y., $180; B. R., of Mass., $40; J. H. R., of Ill., $25; E. W., of Mass., $15; N. F. S., of Ill., $25; H. B. B., of Mass., $15; T. S., of O., $20; C. S. I., of Ind., $15; W. S. M., of Md., $15; S. W. R., of Mass., $30; E. B. R., of N. J., $15; B. F. H., of N. H., $25; W. E. S., of Wis., $15; A. S., of N. Y., $15; T. S., of N. Y., $43; S. H., of England, $20; C. W. R., of Mich., $20; A. K., of N. Y. $18; A. B., of N. Y., $89; O. L., of N. Y., $25; J. R. A., of Pa., $25; A. M. F., of Conn., $20; A. S., of N. Y., $15; J. Q. A. S., of Pa., $30; B. A. M. of Conn., $25; H. K., of N. Y., $15; G. G. L., of Del., $30; C. B. M., of Ill., $25; J. G. E., of Pa., $15; W. M. D., of Mich., $15; S. W., of Mass., $15; J. A. McC., of N. Y., $20; B. R. A., of N. Y., 10; D. K., of Mich., $25; J. B., of Ill., $15; J. T., of N. Y., $50; W. B. W., of Mass., $20; J. B. S., of Prussia, $20; E. H., of Conn., $45; W. H., of N. Y., $45; B. R., of N. Y., $25; E. C., of Ky., $295; N. F., of N. Y., $15; U. H. S., of Ill., $15; J. S. W., of Va., $25; C. W. B., of Mass., $35; H. C. F., of Vt., $25; G. H., of Ill., $25; G. D., of Mass., $15; E. T. B., of Mich., $15; E. J. B., of N. Y., $10; T. McD., of Pa., 25; G. S., of N. Y., $15; W. M., of O., $30; F. G. S., of Mass., $15; R. T. C., of Ill., $15; P. B., of N. J., $20; W. and P., of O., $30; W. B. B., of Ill., $20; G. J., and H. W. R., of N. Y., $20; A. M., of Mass., $20; J. M., of N. Y., $35; L. C. C., of Mich., $20; J. W. S., of N. J., $20; J. B. L., of N. Y., $20; H. W., Sr., of N. J., $12; A. S. H., of Ill., $20; P. N. H., of N. J., $20; S. B. C., of N. Y., $20; A. M. F., of Conn., $10.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from May 14 to Wednesday, May 21, 1862:—

H. W., of N. J.; J. Q. A. S., of Pa.; O. L., of N. Y.; B. R., of N. Y.; H. H. B., of Mass.; G. H., of Ill.; C. B. M., of Ill.; D. K., of Mich.; L. H., of N. Y.; A. M. F., of Conn.; J. S. W., of Va.; J. C. M., of Ill.; B. and R., of Wis.; W. T. G., of Paris; W. M., of O.; T. McD., of Pa., B. F. H., of N. H.; J. H. R., of Ill.; B. A. M., of Conn.; J. R. A., of Pa.; A. G., of N. Y.; H. C. F., of Vt.; N. F. S., of Ill.; T. S., of O.; A. B., of N. Y. (2 cases).

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

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PICKERS.—RICHARD KITSON, HEAD OF WORTHEN street, Lowell, Mass.—Manufacturer of Kitson's Patent Cotton Mixer, Kitson's Patent Cotton Opener, Kitson's Patent Cotton Picker, Kitson's Patent Cotton Waste Machine and Rag Picker; also Build's English Scutchers (pickers), of the following celebrated patterns:—Walker & Hacking, Lorg & Brothers, Taylor, Lang & Co., Manufactures Needle-Pointed Card Clothing, for Carding Hemp, Jute, Flax, &c. Parties in want of second-hand pickers can be informed where to procure them. 21 13

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NOTICE TO INVENTORS AND MANUFACTURERS. —We are the exclusive owners, under Goodyear's patent, of the rights to manufacture, use and sell Vulcanized India Rubber, "so far as it may or can be used," for rolls and coverings for rolls for washing, wringing and starching machines. We know that the "clothes squeezer" must be a necessity in every family so soon as known, and we desire to encourage other parties in the manufacture of it. We, therfore, license makers of good wringers upon liberal terms, and furnish them promptly with the best of rubber rolls—a large supply of which we keep constantly on hand. All parties infringing our rights will be prosecuted to the extent of the law. Address, METROPOLITAN WASHING MACHINE CO., Middlefield, Conn.
20 tf. DAVID LYMAN, Treas.

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ANILINE COLORS.—FUCHSINE, BLUE DE LYON and VIOLET IMPERIAL, of the products of Messrs. RENARD, FRERES & FRANC, Lyons, France. Secured by Letters Patent of the United States, granted July 31, 1860, and July 30, 1861. The undersigned are prepared to offer for sale, or to receive orders for the above products. A. PERSON & HARRIMAN, Nos. 60 and 62 Murray street, New York City. Sole agents for the United States. 17 12*

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The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

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Your obedient servant, J. HOLT.

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A MESSIEURS LES INVENTEURS.—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise e qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront regues en confidence. MUNN & CO.,
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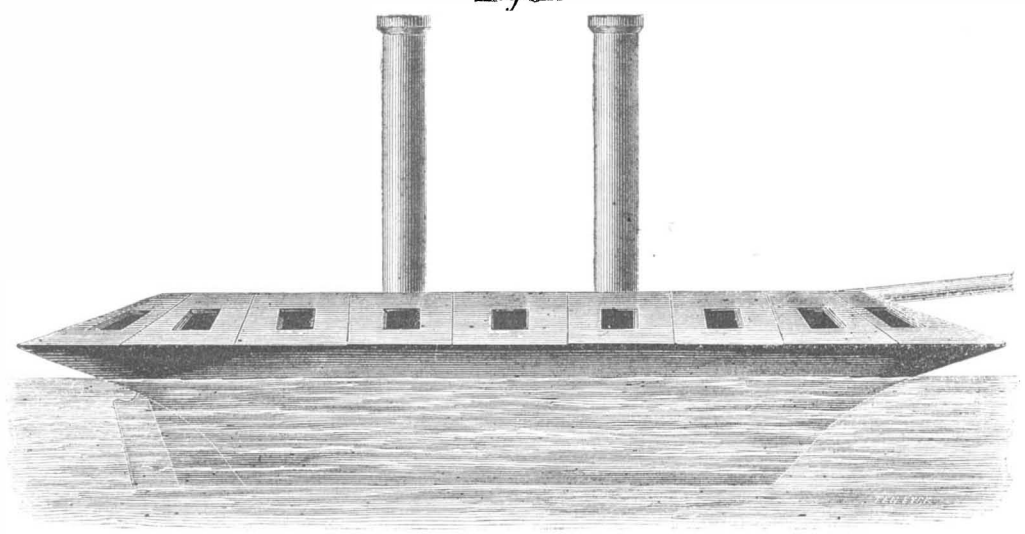
The "Merrimac" Patented Forty-Eight Years Ago.

We announced last week that we had discovered in the Patent Office the specification and drawings of an invention made forty-eight years ago, which, in its essential features, was a facsimile of the famous steamer *Merrimac*. We now publish the specification with engravings of the drawings which are attached to it. The smoke represents the powder in the act of exploding to throw up the hinged portion of the deck into a vertical position, in order to repel boarders. This feature is absurd, but it is not necessarily connected with the other parts of the plan, the practical efficiency of which has, after so great a lapse of time, been so signally demonstrated.

The fact of this important invention lying latent for so many years, is a striking proof of the necessity of exerting energy and enterprise in order to effect the introduction of even the most valuable patents. Unfortunately for the world, there was no SCIENTIFIC AMERICAN in those days.

Fig. 1.



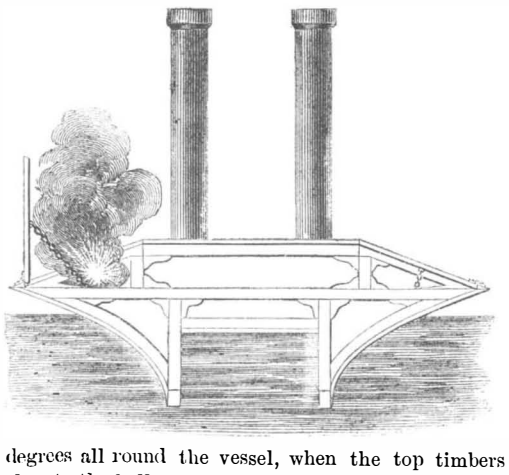
THE EARLY PROTOTYPE OF THE "MERRIMAC."

THOMAS GREGG'S LETTERS PATENT.

The following are the Letters Patent, containing a description, in the words of the said Thomas Gregg himself, of his ball-proof vessel, propelled by steam power applied under her and in her concave stern :—

The boat is framed on an angle of about eighteen

Fig. 2.



degrees all round the vessel, when the top timbers elevate the balls, and the lower ones direct them under her. The top deck, which glances the balls, may be hung on a mass of hinges near the ports. Said deck is supported by knees and cross timbers on the lower side, so that it may be sprung with powder, if required, when boarded by the enemy, to a perpendicular, where said decks will be checked by stays, while the power of the powder will be exhausted in the open air, and then fall on springs to the center of the deck again. (See Fig. 2 cross section.) The aforesaid deck will run up and down with the angle which may be coppered or laid with iron. The gun deck may be boarded at pleasure, to give room, if required, as the men and guns are under said deck. The power is applied between her keels, where there is a concave formed to receive them, from the bow to the stern, except a small distance in each end forming an eddy. The power may be reversed to propel her either way; said power is connected to upright levers to make horizontal strokes alternately. The elevation of her timbers and gearing will be proportioned by her keel and tunnage.

On a Dew Bow Seen on the Surface of Mud.

Prof. Rankine, in a letter to the *Philosophical Magazine*, says :—

There was seen to-day (February 13, 1862), by myself and some other persons in this neighborhood, a very beautiful phenomenon, of which the cause is obvious, and of such a nature that one would expect the phenomenon to occur frequently; but I do not remember to have yet seen any instance of it recorded in any scientific publication. I refer to a prismatically-colored hyperbolic iris, or bow of the first order, exactly resembling that sometimes seen on a field of dewy grass; but in this case it was displayed on the muddy surface of a by-road near Glasgow, and on the less trodden parts of an adjoining turnpike road, throughout a distance of more than a mile. The time was between 12.30 and 1 P. M., Greenwich time; the morning had been hazy, but the mist had cleared away, and the sun was shining brightly.

The angular dimensions of the iris were obviously the same with those of a rainbow of the first order; its color were complete, from red to violet, and very bright and distinct, especially where the mud was softest and moistest; where a sheet of water, how thin soever, covered the mud, the iris vanished. No trace of an iris could be seen on the grass, in the sky, or any where, but on the mud; and on those parts of the turnpike road where the mud had been much disturbed no iris was visible.

The necessary conclusion from this appearance is, that the surface of the mud must have been thickly covered with globules of pure water, perfectly spherical and not in absolute contact with the mud, although resting on it; but those globules must have been extremely minute, for they were invisible to the closest inspection with the naked eye.

Chloride of Lime as an Insecticide.

Dingler's Polytechnisches Journal says :—In scattering chloride of lime on a plank in a stable all kinds of flies, but more especially biting flies, were quickly got rid of. Sprinkling beds of vegetables with even a weak solution of this salt effectually preserves them from caterpillars, butterflies, mordella, slugs, &c. It has the same effect when sprinkled on the foliage of fruit trees. A paste of one part of powdered chloride of lime and one-half part of some fatty matter, placed in a narrow band round the trunk of the tree, prevents insects from creeping up it. It has ever been noticed that rats and mice quit places in which a certain quantity of chloride of lime has been spread. This salt, dried and finely powdered, can, no doubt, be employed for the same purposes as flour of sulphur, and be spread by the same means.

TEN new craters have appeared on Mt. Vesuvius during the present eruption. English photographers are at work taking photographs of the mountain in its excited state.

English Association of Inventors.

The London *Mechanics' Magazine*, of May 2d, says :—

A large and influential meeting of the general reception committee of the Social Science Association was held in the Mansion House, on Tuesday last, the Lord Mayor in the chair. A report was presented by the finance committe, stating the arrangements that had been made up to the present time. Papers on a variety of different subjects connected with the association have been promised by gentlemen intimately acquainted with the various questions which it is proposed to discuss. A series of interesting soirees will be given during the time of the meeting, and it is intended to provide for visits to places and institutions illustrative of the objects of the association. A large attendance of distinguished foreigners is expected. A fund is now being raised for the purpose of meeting the necessary expenses, and a Foreign Reception and Corresponding Committee has been appointed.

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To the Inventor!

The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in these old countries. We shall continue to transfer to our columns copious extracts from these journals of whatever we may deem of interest to our readers.

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FROM THE STEAM PRESS OF JOHN A. GRAY.

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